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The INDUSTRIAL-ARTS MAGAZINE

·JANUARY·1923·

THE·BRUCE PUBLISHING·COMPANY

NEW YORK ▲ MILWAUKEE ▲ CHICAGO

ATKINS
SILVER STEEL SAWS

WHY ATKINS SILVER STEEL SAWS EXCEL

(1) Because the degree of heat and length of heat "bath" each blade shall receive is prescribed by the chemist on the "heat sheet." There is no guess work.

(2) After heating, the plates are plunged in an oil bath, the oil in the bath being held at an even temperature throughout.

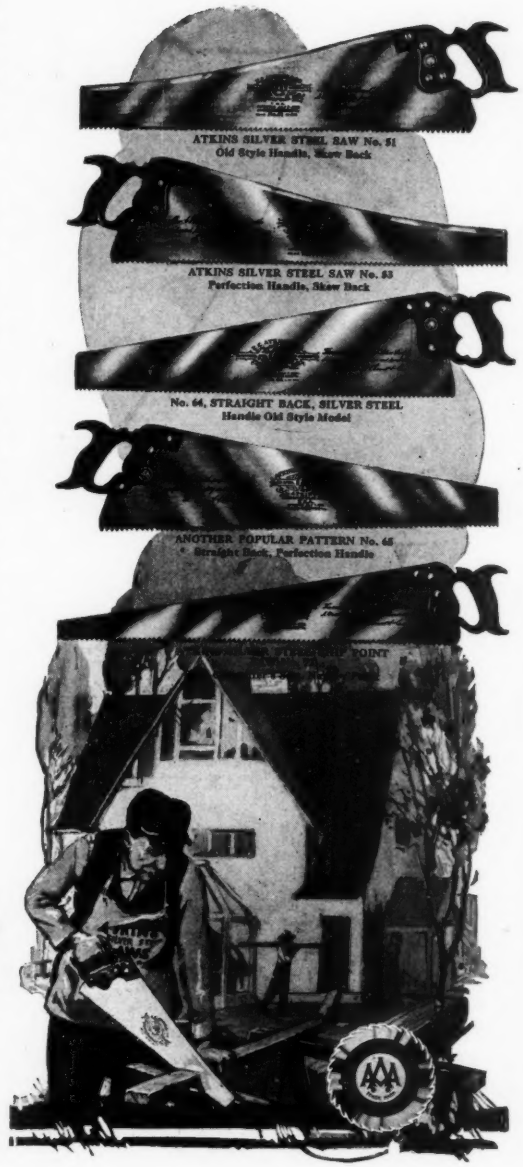
(3) Tempering of Atkins Saws is done in patented gas furnaces where the heat is regulated by automatically controlled devices which assure an even temper without hard and soft spots.

(4) We make our oven gas for our tempering and annealing furnaces and this gas is put through a series of washing and rinsing operations to make it free from sulphur and other harmful gases.

(5) These extra-particular precautions made Atkins Silver Steel Saws, uniformly tough, just hard enough without being brittle, and exactly the same toughness and hardness in every square inch of their surface—so that they wear evenly throughout the entire blade and cut clean a longer time without sharpening than any other saws made.

(6) Atkins Saws are made in Regular and Ship Point Patterns, Skew and Straight Back, with a choice of handles, the Old Straight-Across or Perfection Pattern, hence

ATKINS SAWS ARE PREFERRED BY MASTER CARPENTERS


ATKINS SILVER STEEL SAW No. 51
Old Style Handle, Skew Back
ATKINS SILVER STEEL SAW No. 53
Perfection Handle, Skew Back
No. 64, STRAIGHT BACK, SILVER STEEL
Handle Old Style Model
ANOTHER POPULAR PATTERN No. 65
Straight Back, Perfection Handle

Send 30 cents for nail apron, Saw Sense and a useful souvenir.

E.C. ATKINS & CO.

ESTABLISHED 1857 THE SILVER STEEL SAW PEOPLE

Home Office and Factory, INDIANAPOLIS, INDIANA

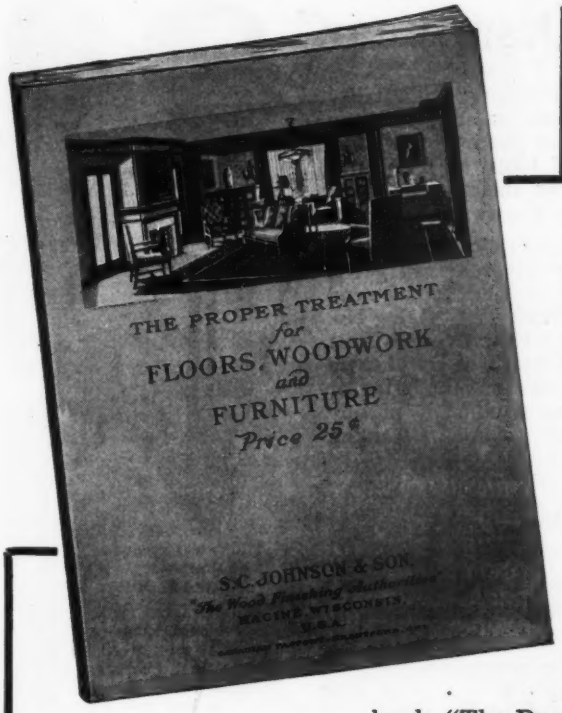
Canadian Factory, Hamilton Ontario

Machine Knife Factory, Lancaster N.Y.

Branches Carrying Complete Stocks In The Following Cities:

Atlanta	New Orleans	Seattle
Memphis	New York City	Paris, France
Chicago	Portland, Ore.	Sydney, N. S.W.
Minneapolis	San Francisco	Vancouver, B.C.

Gen.
Wahr.



Get Your Copy of This Book

It's the best book ever published on Artistic Wood Finishing and should be in the hands of every Wood Finishing Instructor. It is full of valuable information on finishing all wood—soft and hard. Considerable space is devoted exclusively to the finishing of manual training models. It's the work of experts—illustrated in color.

HOW TO GET IT FREE

Write us (mentioning the name of the firm from whom you buy paints, varnishes, etc.), and we will gladly send you our book, "The Proper Treatment for Floors, Woodwork and Furniture" free and postpaid.

JOHNSON'S ARTISTIC WOOD FINISHES

Johnson's Artistic Wood Finishes are particularly adapted for manual training work as they may be applied by the youngest and most inexperienced pupils with good results. Johnson's Artistic Wood Finishes are standard for manual training—they are being used all over the United States and Canada for this purpose.

Our line of Artistic Wood Finishes is complete—it includes:—

Johnson's Prepared Wax
Johnson's Wood Dye
Johnson's Crack Filler
Johnson's Paste Wood Filler
Johnson's Perfectone Undercoat
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You will find this entire line described in our book. Any time specific information is desired, or whenever you want specially finished wood panels, do not hesitate to write us. We solicit correspondence with Manual Training Instructors.

Mail attached coupon for this authoritative book on Wood Finishing.

S. C. JOHNSON & SON, RACINE, WIS
"THE WOOD FINISHING AUTHORITIES"
(Canadian Factory—Brantford)

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Please send me free and postpaid your authoritative book on Artistic Wood Finishes for use in manual training work.

The best dealer in paints here is.....

My Name.....

My Address .....

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"Watch the Screws Disappear"

"Driving screws into hard wood is often tough work," declares Mr. Punch. "But under this Goodell-Pratt Ratchet Screw-Driver they go in like magic. Hard or soft wood — it makes no difference to this tool. That's one reason why trade school students like to use it."

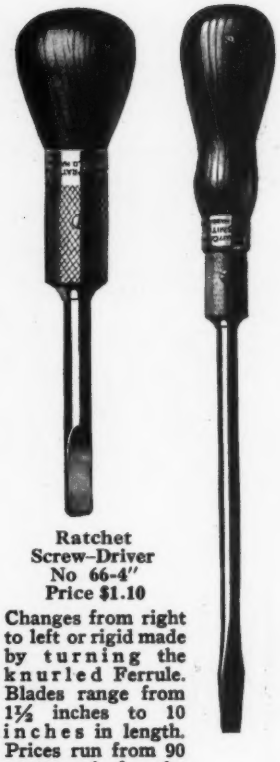
The ratchet mechanism is convenient and a time-saver. It can be set so that the blade turns only to the right or to the left, while the handle revolves freely. Blade and handle can also be kept rigid.

These screw-drivers have made a reputation for strength, durability and convenience among workmen who appreciate good tools. They feel like good tools, act like them and soon prove their worth. Ask any man who knows good tools.

Your hardware dealer has this ratchet screw-driver or can get it for you. Meanwhile, let us send you our free illustrated catalog No. 14 describing all the Goodell-Pratt "1500 Good Tools." Many of them are just the tools for completing or improving the equipment of any vocational or manual training school.

GOODELL-PRATT COMPANY, Greenfield, Mass., U. S. A.

Toolsmiths



Ratchet Screw-Driver No 66-4" Price $1.10

Changes from right to left or rigid made by turning the knurled Ferrule. Blades range from 1½ inches to 10 inches in length. Prices run from 90 cents each for the former to $1.50 for the latter.

GOODELL-PRATT
1500 GOOD TOOLS

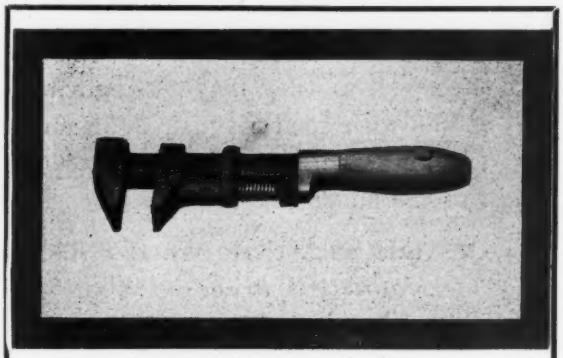
MAYDOLE HAMMERS
THE WORLD'S STANDARD

There are none better made—none better known. When you buy these hammers, you are certain of getting the best. They are used the world over.

Maydole Hammers are made of finest quality material, and guaranteed first-class in every respect.

Write for our booklet of useful information, which every student should have. How many shall we send?

The David Maydole Hammer Company
NORWICH NEW YORK U. S. A.



Better Tools make better Workmen

There are no better Screw Wrenches made than the "W & B" Knife Handle Pattern.

7 sizes—6 to 21 inches.
2 other models also.

Ask for Screw Wrench Booklet

J. H. WILLIAMS & CO.
"The Wrench People"

BROOKLYN 157 Richards St. | BUFFALO 157 Vulcan St. | CHICAGO 1157 W. 120th St.

No. 531 (Ford) Auger Bit. Other numbers left to right: 542, 812, 935, 931, 532

The better the Tools The better the Work

GOOD tools are an economy—always. They enable you to do better work—and to do it more quickly. Millers Falls Bits and Augers are good tools. Thousands of carpenters and mechanics use them. In manual training and vocational schools all over the country these workmanlike tools are giving a good account of themselves.

Millers Falls Bits and Augers are made in all lengths of twist, both single twist and solid center. They provide a complete line which meets all wood boring conditions. Well proportioned lips and spurs, accurately formed heads, keen cutting edges, and deep, clean cut screws characterize these Millers Falls bits.

Here is the complete line of Millers Falls Bits and Augers with their

6 different Heads
26 distinctive Types
46 Stock Sizes

Auger Bits
Electrician's Bits
Ship Auger Bits
Ship Auger Car Bits
Extension Lip Car Bits
Ship Augers
Ring Augers
Boring Machine Augers
Rafting Augers
Machine Bits
Nut Augers

No. 531 (Ford) Auger Bit

(Illustrated at left)

is a fine tool to know about

Here are some of the advantages it offers:

1. Bores with less friction than most.
2. Wide throat and deep center prevent clogging.
3. Bores equally well in all kinds of wood—wet or dry.
4. Cuts out with little splintering.
5. Easier to resharpen.
6. Bores faster than the regular double-lip bits.

Millers Falls Company

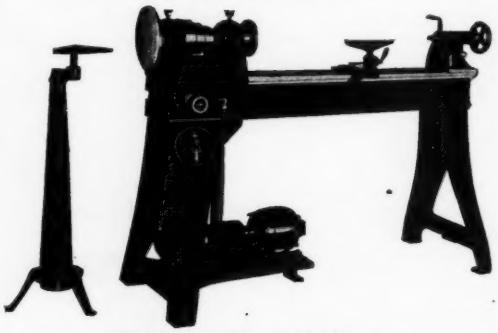
Millers Falls, Mass.

Manufacturers of Carpenters' Tools, Hack Saws and Automobile Tools.

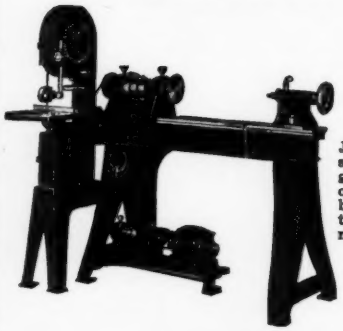
LITTLE GIANT

MANUAL TRAINING DEPARTMENT

SPECIAL EQUIPMENT

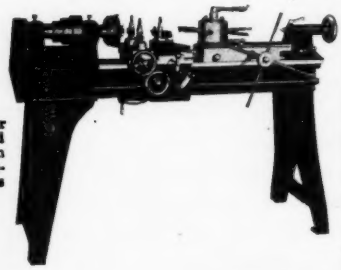


Wood Lathe—motor or belt driven.



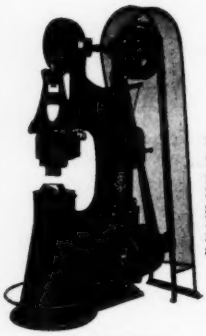
Combination Wood Lathe and Band Saw.

Jointer, planer, jig-saw, sander, buffer, grinder, mortiser and other equipment can be furnished and attached in a similar manner.



Metal Lathe—Motor or Belt Driven.

Miller, planer, gear cutter, grinder and other equipment can be furnished and attached the same as with wood lathe.



Power Hammer—Motor or Belt Driven.

All Little Giant Wood and Metal Working Equipment is sold on 30 days' trial, and guaranteed FOREVER against defective material and workmanship.

Band Saw—Motor or Belt Driven.

LITTLE GIANT COMPANY

Established 1876

223 Rock St. Mankato, Minn., U .S. A.

TRADE MARK

"STAR"

Hack Saws

HAVE STOOD THE

TEST OF TIME

CLEMSON BROS., Inc.

MIDDLETOWN, N. Y.

Makers Since 1883

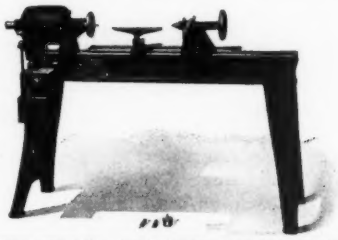
Established 1847 — Incorporated 1878

SMITH OF SMITHVILLE

Woodworking Machinery

Motor-Driven

WOOD LATHE



THE NEW No. 483-B MOTOR HEAD LATHE

Motor ½ H. P. with Speed 750 to 3,000 R. P. M., regulated by the control box on front of lathe. Has a swing of 12". Made for Alternating or Direct Current. Can be had in various lengths, also larger swing.

Write for complete information

H. B. Smith Machine Co.

Smithville, N. J., U. S. A.

Or Nearest Branch

NEW YORK CHICAGO ATLANTA SAN FRANCISCO

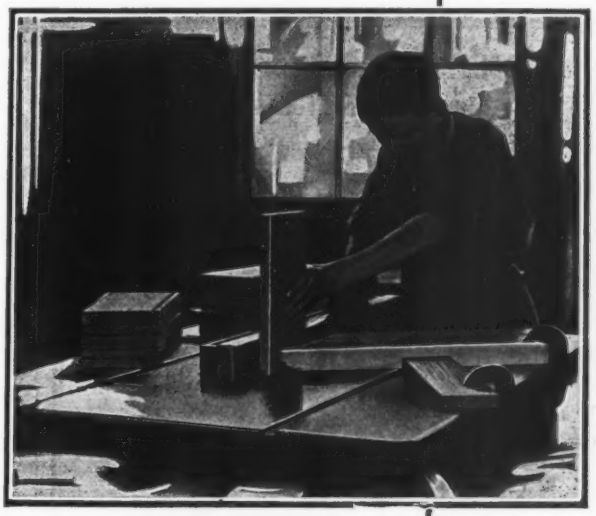
TEACHERS — $10,000 for your Ideas

OVER TEN THOUSAND ($10,000) in cash and valuable prizes given to teachers of Cabinet Making and Directors of Vocational Education having under their charge this activity of vocational school work.

We want your thoughts on how to make the woodworking or cabinet making department more educational in the training of boys. We don't care about the technical (or trade) side except as it may relate to the educational phase of the subject.

We believe that cabinet making is replete with possibilities for character building,—for mental and cultural development. We want you to tell us what you think of the idea—what you are doing or propose to do to emphasize the cultural side of cabinet making in the training of your boys.

Every teacher who sends us 500 words or more on this subject will be rewarded for his endeavor. The best thoughts on the subject will be bound in book form and distributed broadly throughout the country. And essays considered worthy of entrance into this book will be awarded special cash prizes according to their merit to be established by a board of Judges, consisting of three men high in the vocational field.



Write for details

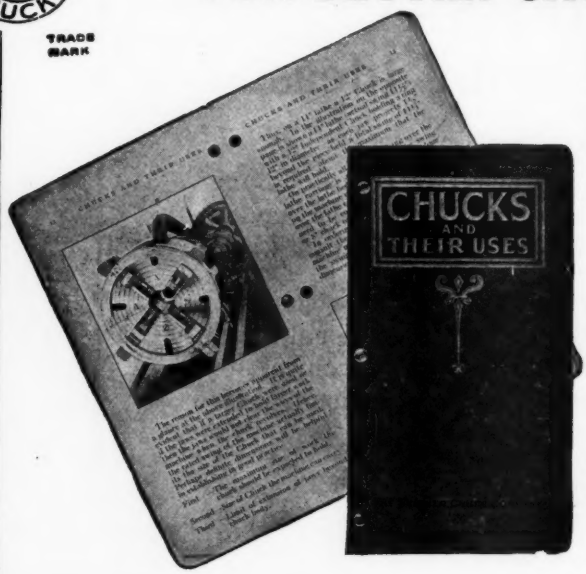
American Wood Working Machinery Co.

ROCHESTER, N. Y.

SKINNER CHUCKS

TRADE MARK

FOR BETTER CHUCK SERVICE



We have manufactured chucks for thirty-odd years and during this time have naturally acquired much data and information not in the possession of chuck users generally. We felt that this information, placed for ready reference in the hands of those interested in chucks, would help them to secure the fullest measure of service from their chucks. Therefore, we have just published a conveniently sized handbook entitled

"CHUCKS AND THEIR USES"

Valuable to Vocational Directors and Students.

Those interested will receive a copy of this book without charge. It includes:—

A history of chucks, and their development—
A full description in everyday language of the different types of standard chucks—
Suggestions for the proper care of chucks—
Best methods of fitting chucks to lathes—
Suggestions for general shop practice.

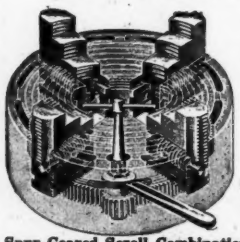
A number of these books, distributed among the students in your school shops, should prove of value. A copy will be sent free upon request to anyone giving personal name and occupation.

Write for your copies now. No charge.

DURABILITY — ACCURACY — STRENGTH

are striking features of

Westcott Chucks



Spur Geared Scroll Combination Lathe Chuck

They are as essential in the schoolroom as in the commercial shop. The student who learns his trade using the very best of tools and equipment, is sure to benefit in the end.

In the case of chucks—
BUY WESTCOTT

Little Giant Double Grip Drill Chuck

Mainly About Your Classes

If you are not using Westcott Chucks now, you should certainly give your boys this advantage. Their best work can only be accomplished on the best equipment. Specify Westcott Chucks on your next order—in the meantime send for our catalogue.

Manufacturers of chucks for every class of work.

WESTCOTT CHUCK COMPANY

Oneida, New York

with the LOCKED HANDLE

The patent wedge does it!

Only on V & B Hammers, and remember, each hammer carries the Underwriters' Laboratories label.

When you buy V & B Hammers, you buy quality plus safety!

VAUGHAN & BUSHNELL MANUFACTURING COMPANY

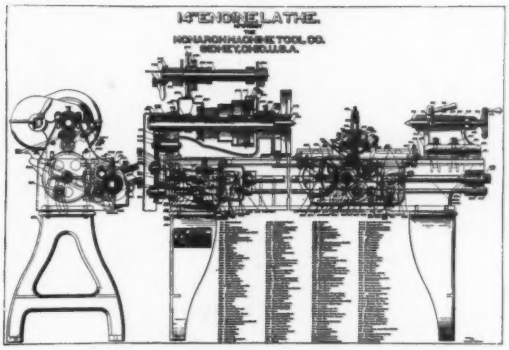
Makers of Fine Tools

2114 Carroll Ave. Chicago, Ill. U.S.A.

INSTRUCTORS IN MACHINE SHOP PRACTICE

Send for this 3 foot by 5 foot blue print of the 14-inch Monarch Lathe. It is gratis to you.

It will be sent by mail carefully packed, and all ready to hang on the wall in your class room.



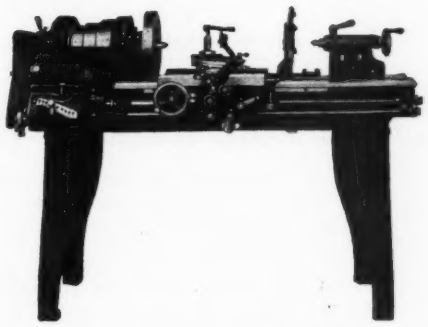
This Complete Blue Print, 3′ x 5′, Sent Free to Vocational Training School Instructors.

You will find it of value in instructing your pupils in machine tool design and in engine lathe construction. Each part of the lathe is numbered and named.

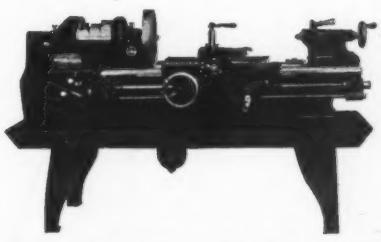
Every detail of construction of the lathe is clearly shown on the drawing, which represents the most advanced ideas of modern engine lathe design and construction.

The Blue Print is made on extra heavy paper and is mounted with rods on the top and bottom, and hangs on the wall like a map.

These Blue Prints are quite expensive to make and distribute, yet we have one for each Vocational School Instructor. Send for yours NOW. Give us your name, title and address together with the name of your school and the Blue Print will be mailed you postpaid at once.



10" and 12" by 5' Bed Monarch Lathe. Weight 1150 lbs.



14" x 6' Monarch Quick Change Gear Lathe with Oil Pan.

The Monarch Machine Tool Co.

304 Oak Street **Sidney, Ohio**

Largest builders of high grade engine lathes in the world, and specialists in lathes for Vocational Training.

THE JOHNSON FRICTION CLUTCH

FOR NEW SCHOOLS

Install a Johnson Lineshaft Drive in the Manual Training Department

The practical experience of hundreds of our customers has established their belief in the Johnson Clutch Drive as the ultimate method of power transmission.

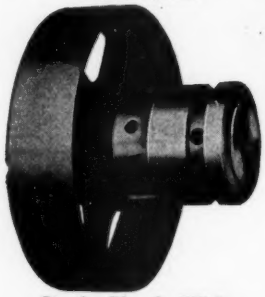
It replaces the countershaft, with its old-fashioned tight and loose pulleys, and its troublesome overhead belting.

It avoids the expense of individual motors, and the waste of current they involve.

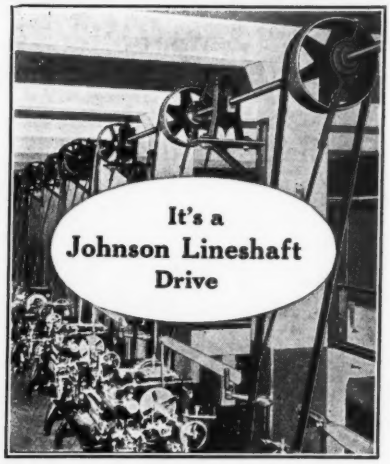
It substitutes reliable clutch control—economical in first cost, efficient in operation, durable under all kinds of service.

"We are still using Johnson Clutches with very good success and have had them installed in our Nut Tapping Department for about ten years and at least half of that time they have been running night and day. We are also very greatly pleased with their operation in direct drives from lineshafts to lathes and other machines in our Machine Shop Departments."

THE NATIONAL SCREW & TACK CO.
CLEVELAND, OHIO



Single Clutch, With Pulley Mounted.



An installation made ten years ago on Lodge & Shipley Lathes, still in perfect condition.

Friction Control Means Better Machinery

We specialize in friction clutches alone and can supply the right clutch for any drive. Hundreds of standard sizes in stock to fit all shaft and pulley dimensions.

Write for our stock list and Catalog "IAM"

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

WORTH WHILE

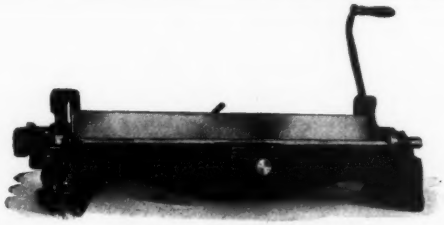
PEXTO

MACHINES AND TOOLS
For
SHEET METAL WORK

If not already equipped, eventually you will join some four hundred progressive schools in voicing favorable expression for what this course offers and how Pexto equipment has helped to make the work a success.

Our Engineering Department is at your service.

THE PECK, STOW & WILCOX CO.
SOUTHINGTON, - CONN.



KEYSTONE BAR FOLDER

Sheet Metal Working Tools

To secure a finished job, accurate tools are necessary. Use Niagara equipment and you are positive of the quality of that particular job.

Presses, Punches, Squaring Shears, Ring and Circle Shears, Tinners' Tools and Machines.

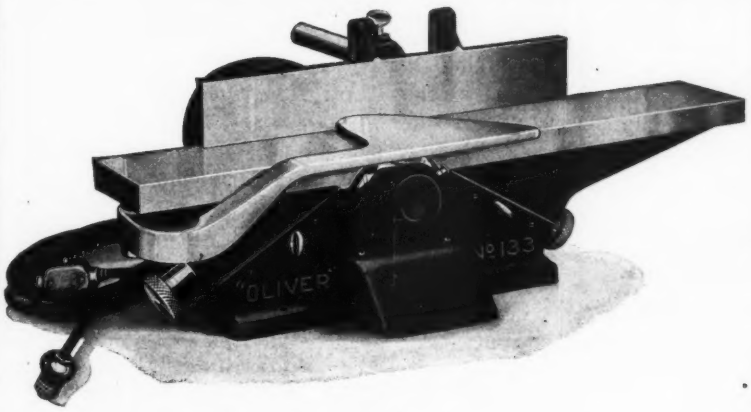
Send for Catalog.

NIAGARA MACHINE & TOOL WORKS
Established 1879
BUFFALO, N. Y. U. S. A.

NIAGARA

60197

"Oliver"



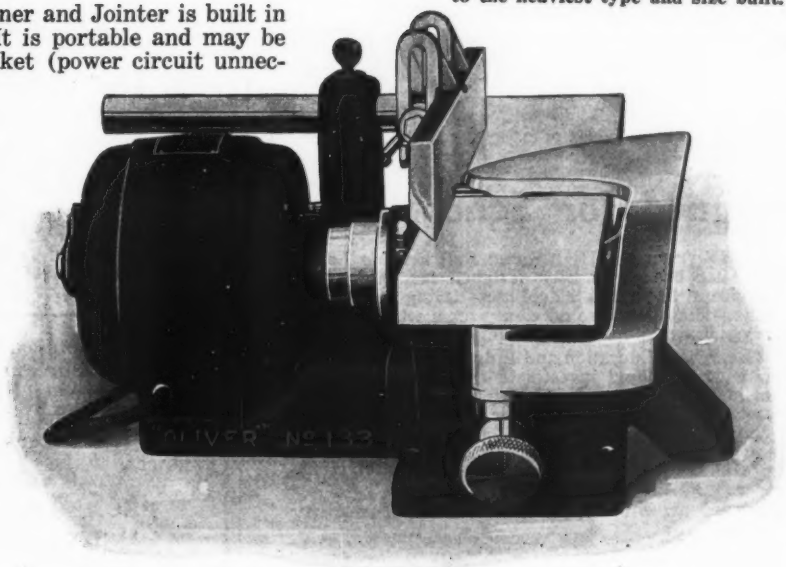
Portable Hand-Planer and Jointer

OLIVER

There is an "Oliver" Jointer to meet your requirements.

They are made in sizes from these 4-inch and 6-inch portable machines to the heaviest type and size built.

This No. 133 Hand Planer and Jointer is built in 4-inch and 6-inch sizes. It is portable and may be connected to any lamp socket (power circuit unnecessary). It is direct connected to ball bearing motor, efficient, quiet, well guarded, and is a wizard for work. It will do more jointing and planing in half an hour, and do it better, than can be done in half a day by hand.



Let us send you further particulars.

Oliver Woodworking Machinery is better but costs no more.

Oliver Machinery Co., Grand Rapids, Michigan, U. S. A.

UNION PORTABLE

6" Jointer.
16" Band Saw.
Universal Saw Bench.
Plain Saw Bench.
4" Jointer.
Shaper.
Com. Universal Saw and 6" Jointer.

Union Universal Saw Bench

THEY ARE ON WHEELS
Take the machine to the job.

Also furnished as BENCH TYPE MACHINES.

We recommend machines with the base which makes them conveniently portable.

All machines equipped with suitable motor with convenient switch to start or stop. Any lamp socket acts as your power supply line. Safety provisions have been taken care of to the absolute limit.

Send for Bulletin and Prices.

UNION MACHINE CO.
31 Ottawa Ave., N.W., Grand Rapids, Mich., U.S.A.

PISTOL GRIP RATCHET SCREW DRIVER

Furnished with Interchangeable Blades to Fit Common Sizes of Screws

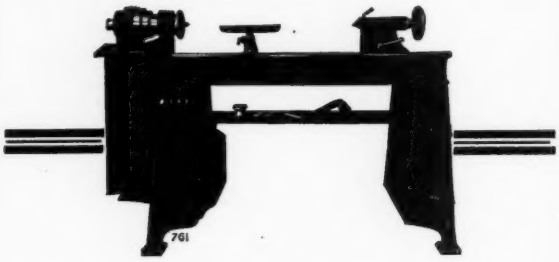
TRY A SET

Catalog showing complete line of Clamps and many other "Hargrave Quality" tools sent upon request.

THE CINCINNATI TOOL CO.

Established 1879
Incorporated 1884

Waverly Ave. and C. L. & N. Ry.
CINCINNATI, OHIO



Designed for School Work

THE American High Speed Ball Bearing Lathe has been especially designed for the severe service of Industrial School use—having those three outstanding points so necessary for a school lathe—ruggedness, simplicity and unusual safety features.

Boards of Education and Industrial School Superintendents should investigate the "American" line of high quality saw benches, jointers, planers, band saws, wood-workers and other manual training machinery.

Write for complete specifications and description.

American Saw Mill Machinery Company
74 Main St. Hackettstown, N. J.

AMERICAN
MANUAL TRAINING EQUIPMENT

When You Think of Supplies

For Your Sheet Metal Working Course

THINK OF

BERGER BROS. CO.

You don't have to shop around when you buy of us. We carry everything from a rivet to the largest machine used for this work.

Ask Any Sheet Metal Worker

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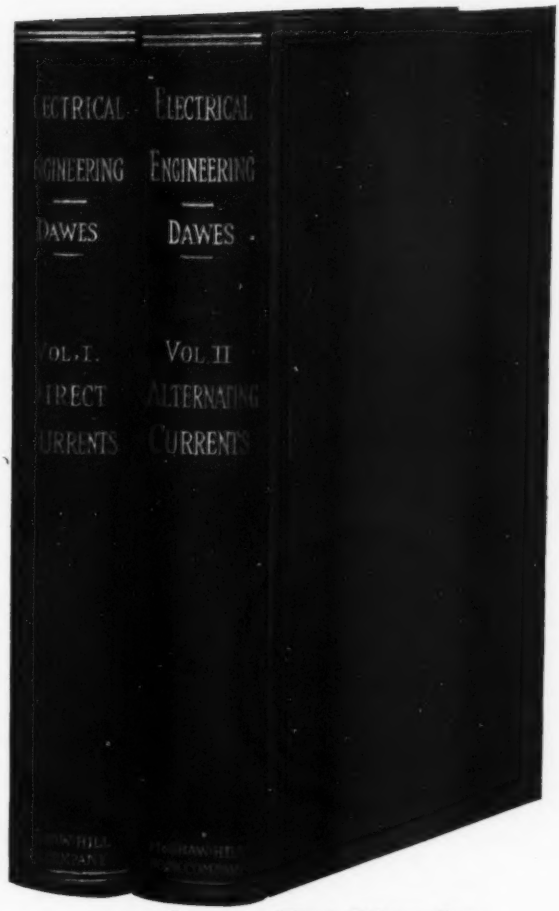

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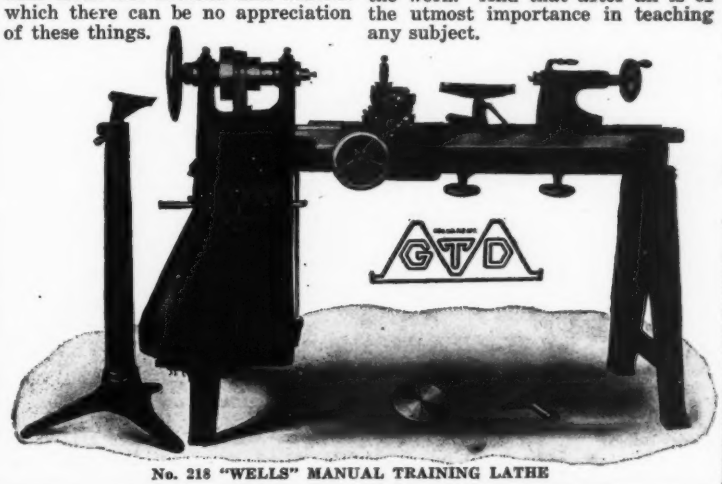

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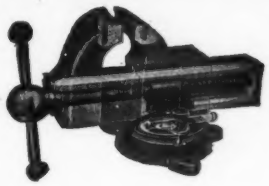

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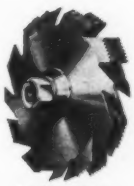

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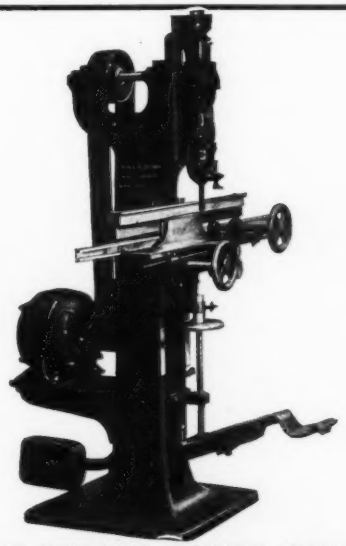

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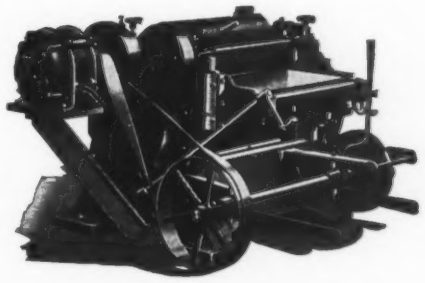

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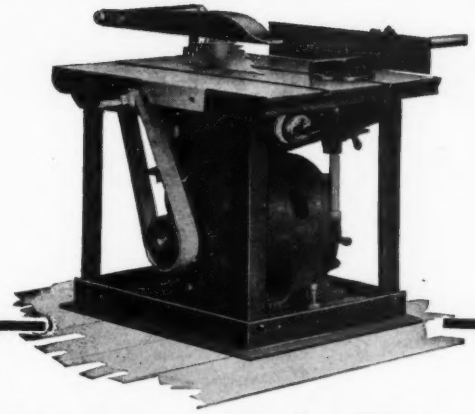

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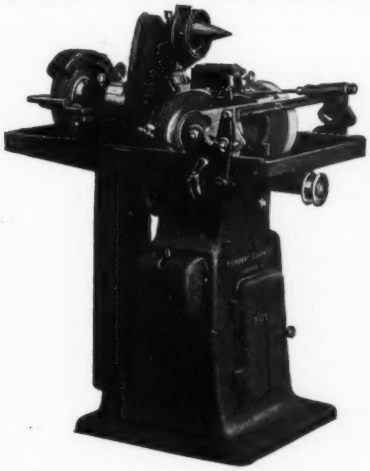

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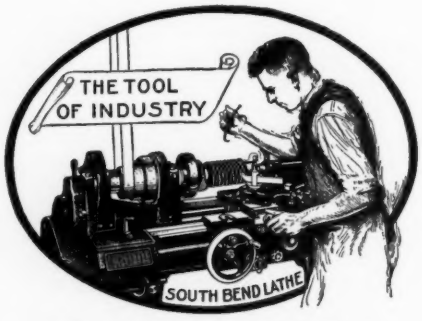

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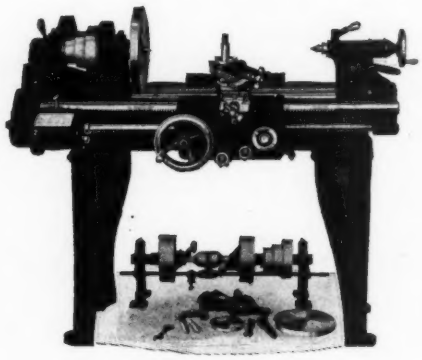

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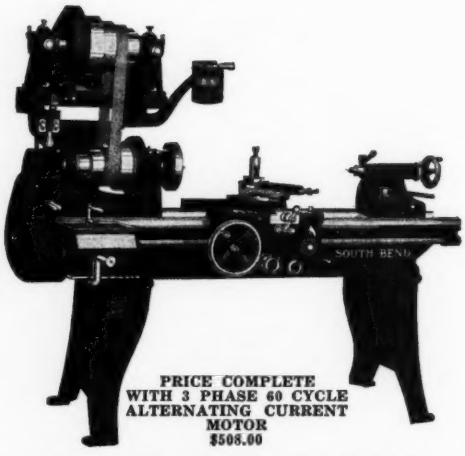

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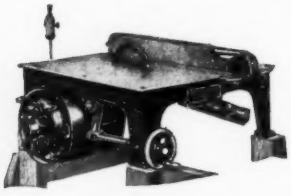

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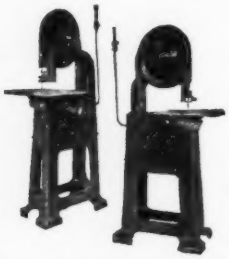

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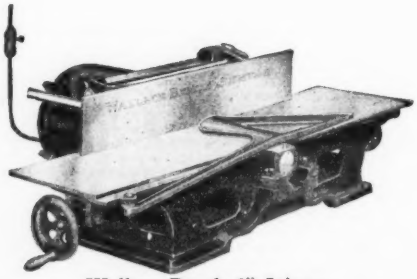

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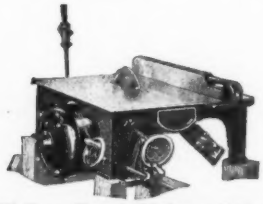

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INDUSTRIAL-ARTS MAGAZINE

Volume XII JANUARY, 1923 No. 1

Graphic Aids in Organization of Occupational Content for the Development of the Vocational Teacher

H. F. Good, E. J. Neary, C. A. Bowman, of Stout Institute.

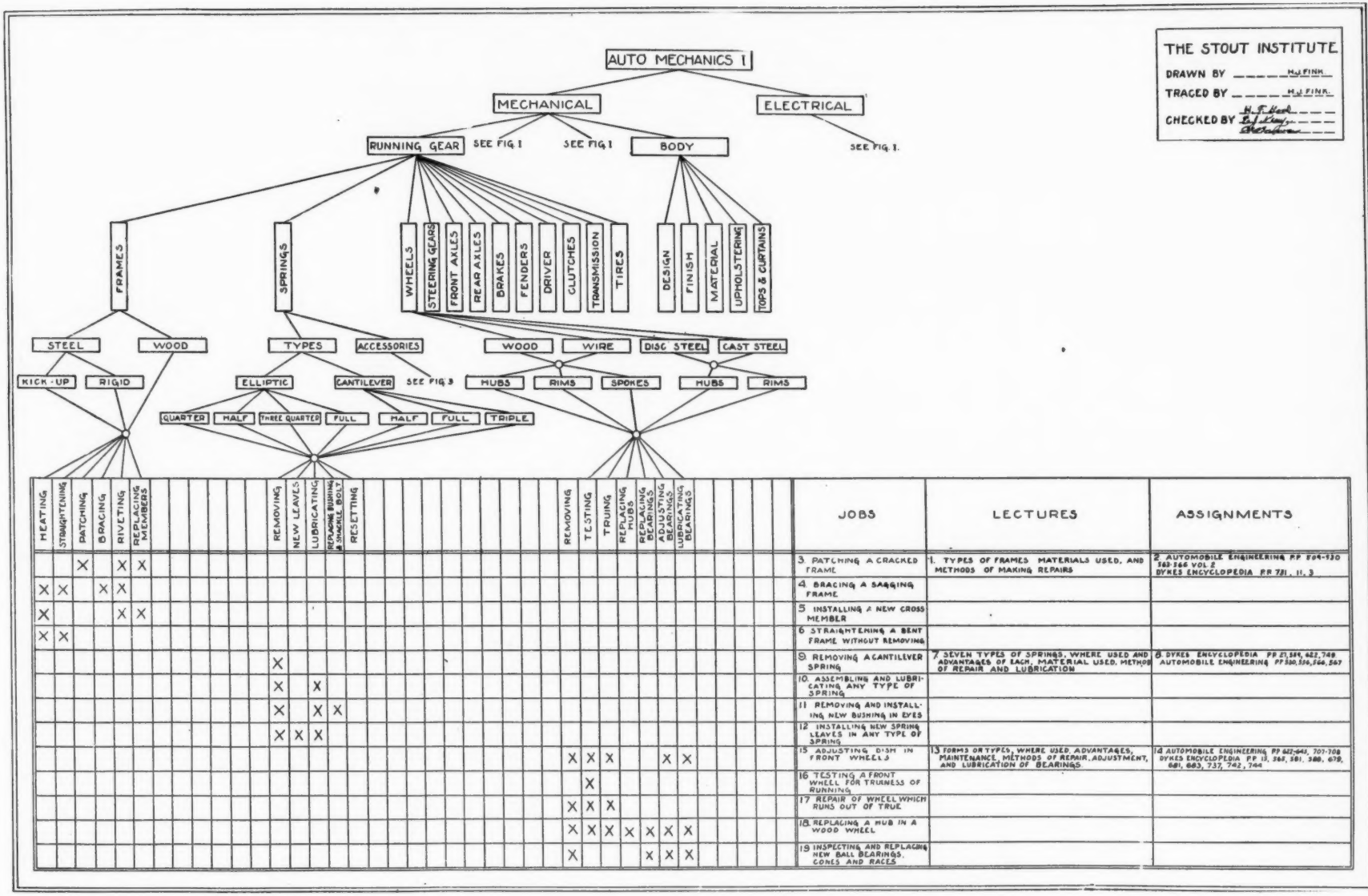
IN studying the teacher training problem at Stout Institute, the school has carried the various groups of men necessary as the teaching of industrial work has progressed in public schools. In the early years of Stout Institute the men trained were called manual training teachers, later manual arts teachers, and now they are called industrial arts teachers and vocational teachers. Three groups of men now take teacher training at Stout Institute. The first group is made up of high school graduates who come directly from the high school with no practical experience, taking two-year or four-year teacher-training courses leading to positions in the junior and senior high schools. The second group is made up of people with similar qualifications to those in the first, who do not come directly from the high school but secure practical experience before taking the teacher-training course at Stout. In this group also are the men who have finished the two-year teacher-training course, have been teaching, and are now securing the third and fourth years for the degree. The third group is made up of journeymen with two years' experience beyond the apprentice period selected by the State Board of Vocational Education and sent to the school for a teacher-training course. By special agreement there are added to this group five qualified men in addition to those sent by the state board.

The first named group qualifies only for junior and senior high schools. The second group qualifies for junior and senior high schools and vocational schools, and the third group for vocational schools.

There are now available at Stout Institute 21 different kinds of industrial work in teacher-training for men. There are of course many modifications and combinations of these. The growth of the junior high school with its attendant pressure on the senior high school to furnish courses with definite vocational and educational objectives, and the development of the vocational education fostered by the Smith-Hughes law, together with the various state laws, have brought us to a rather clear recognition of what must compose teacher-training for shop and drawing positions.

In the calls for teachers for an average year which come to Stout Institute, there are between sixty and seventy different combinations of kinds of shop or drawing. The training of the teacher, besides placing him in possession of the content for teaching, must also enable him to answer three questions relative to his classes wherever he teaches. He must know "Who comes?" "What for?" and "How long?" The classifications of the groups of pupils in the junior high school, usually academic, commercial, industrial, household arts, or agricultural; the classifications of pupils in the senior high school, usually college preparatory, commercial, technical, agricultural, or vocational; the classifications in the vocational school, usually commercial, home economics, agricultural and trade and industrial, all of these force upon the teacher of shop or drawing a requirement that he know the classification of the group he is teaching. Too frequently in the vocational school the teacher regards himself as a teacher of machine drawing, as a teacher of carpentry, as a teacher of auto-mechanics, as a teacher of machine cabinet making and so on, rather than a teacher of evening industrial classes in extension work, or a part time trade preparatory class, or a part time trade extension class, and so on.

The junior high school philosophy when applied in the industrial work requires the teacher to classify occupational fields, local, state and national and to provide such shop opportunities for try-out participation as will give the junior high school pupil a basis for intelligent choosing when leaving the junior high school to go to work, to go to the senior high school or to go to the vocational school. The recruiting of the senior high school with classified pupils, the latter the result of the growth of the junior high school, makes it necessary to have the industrial work in the senior high school clearly pointed in the direction of definite occupational objectives. In the vocational school the necessity for close co-ordination between the content of the courses taught and the demands in occupations is well understood. The present trend, therefore, requires that the industrial teacher, wherever he finds himself, must arrange shop or drawing course content according to its present divisions in occupational groups.



JOBS	LECTURES	ASSIGNMENTS
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4. BRACING A SAGGING FRAME		
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6. STRAIGHTENING A BENT FRAME WITHOUT REMOVING		
9. REMOVING A CANTILEVER SPRING	7. SEVEN TYPES OF SPRINGS, WHERE USED AND ADVANTAGES OF EACH, MATERIAL USED, METHOD OF REPAIR AND LUBRICATION	8. DYKES ENCYCLOPEDIA PP 21, 389, 622, 748 AUTOMOBILE ENGINEERING PP 530, 536, 566, 567
10. ASSEMBLING AND LUBRICATING ANY TYPE OF SPRING		
11. REMOVING AND INSTALLING NEW BUSHING IN EYES		
12. INSTALLING NEW SPRING LEAVES IN ANY TYPE OF SPRING		
15. ADJUSTING DISH IN FRONT WHEELS	13. FORMS OR TYPES, WHERE USED. ADVANTAGES, MAINTENANCE, METHODS OF REPAIR, ADJUSTMENT, AND LUBRICATION OF BEARINGS.	14. AUTOMOBILE ENGINEERING PP 622-642, 707-708 DYKES ENCYCLOPEDIA PP 13, 368, 381, 388, 679, 681, 683, 737, 742, 744
16. TESTING A FRONT WHEEL FOR TRUENESS OF RUNNING		
17. REPAIR OF WHEEL WHICH RUNS OUT OF TRUE		
18. REPLACING A HUB IN A WOOD WHEEL		
19. INSPECTING AND REPLACING NEW BALL BEARINGS, CONES AND RACES		

FIG. I.

Taking the three questions listed above, namely, "Who comes?" "What for?" and "How long?" the first is the analysis of the enrollment, present and potential. This analysis is made on many bases, color, age, school progress, mental ability, general intelligence, vocational objectives, present occupation, etc. The industrial teacher is indeed interested in that portion of the answer to the question, "Who comes?" which classifies his students by occupational and educational experience and occupational objectives.

In classifying pupils by occupational objectives the present practice in industry in defining the limits of an occupation has decided bearing. Often the pupil in the vocational school has ahead of him an occupation which is one part of what formerly was called a trade. In answering the question "What for?" the occupational field may be listed. In answering the question "How long?" the limitations of choice for school work for the pupil can be defined.

In suggesting graphic aids to help the development of a vocational teacher we have found that while such aids are of use in connection with tally records, with index sheets for keeping track of unit lessons and various other phases of the teacher's detailed work, the chief aid of a graphic nature is in the arrangement of the total content of the occupational field which the teacher represents. The vocational teacher is called upon over and over to select from the total field a part, often a very small part, because of the answers to the three questions, "Who comes?" "What for?" and "How long?" Frequently the teacher will have before him a group of pupils, each pupil having a separate answer so far as his personal problem is concerned for the three questions. To enable the teacher and the pupils to orient themselves in the whole field a chart is of decided assistance. The foregoing remarks merely touch the high spots in the experiences which have led up to the present use of graphic devices to aid in the organization of occupational content in the development of the vocational teacher.

To illustrate these devices it is well to take one of the most difficult subjects to secure comprehensive analysis in from the vocational teacher in training, namely, auto mechanics. Figure No. 1 is a sample of the various layouts which are going through now to aid the vocational teacher in organizing his lesson content in relation to the trade content. Below this are the units of trade content arranged logically for convenience in teaching. Three of these in Figure 1 and three of these in Figure 2 are detailed to show the basic things done in these units. At the right three columns of information are listed. The first column is made up of the definite job assignments of work to be given the students in the shop. Next is a column showing the lectures and demonstrations to be given by the teacher on "symptoms" and operating facts necessary for the intelligent carrying through of the job assignment. In the third column are listed the definite reference reading and text reading assignments to be carried on by the students in connection with the job. If program arrangement demands it these readings may be carried on during the shop lesson, or if desired, outside of the shop lesson, depending upon the classification of students.

At the left opposite the job assignments and under the basic things done, the relationship of the jobs assigned to the things done in the occupation is shown. In some trades, for instance that of the job shop sheet metal worker, the list of basic things done can be carried down to the detailed operations. In auto mechanics this is not practical in a graphic layout as the chart becomes too unwieldy.

Each unit is first broken down as is indicated in Figures A, F and D, G, H, J, III, IV, VII, X, etc., and then carried down to the basic things done. The

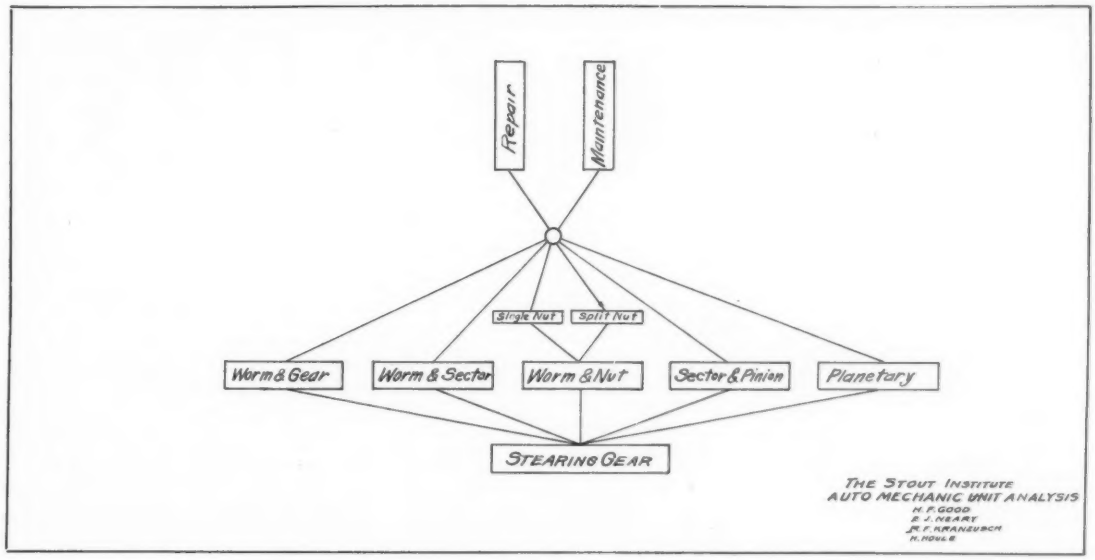
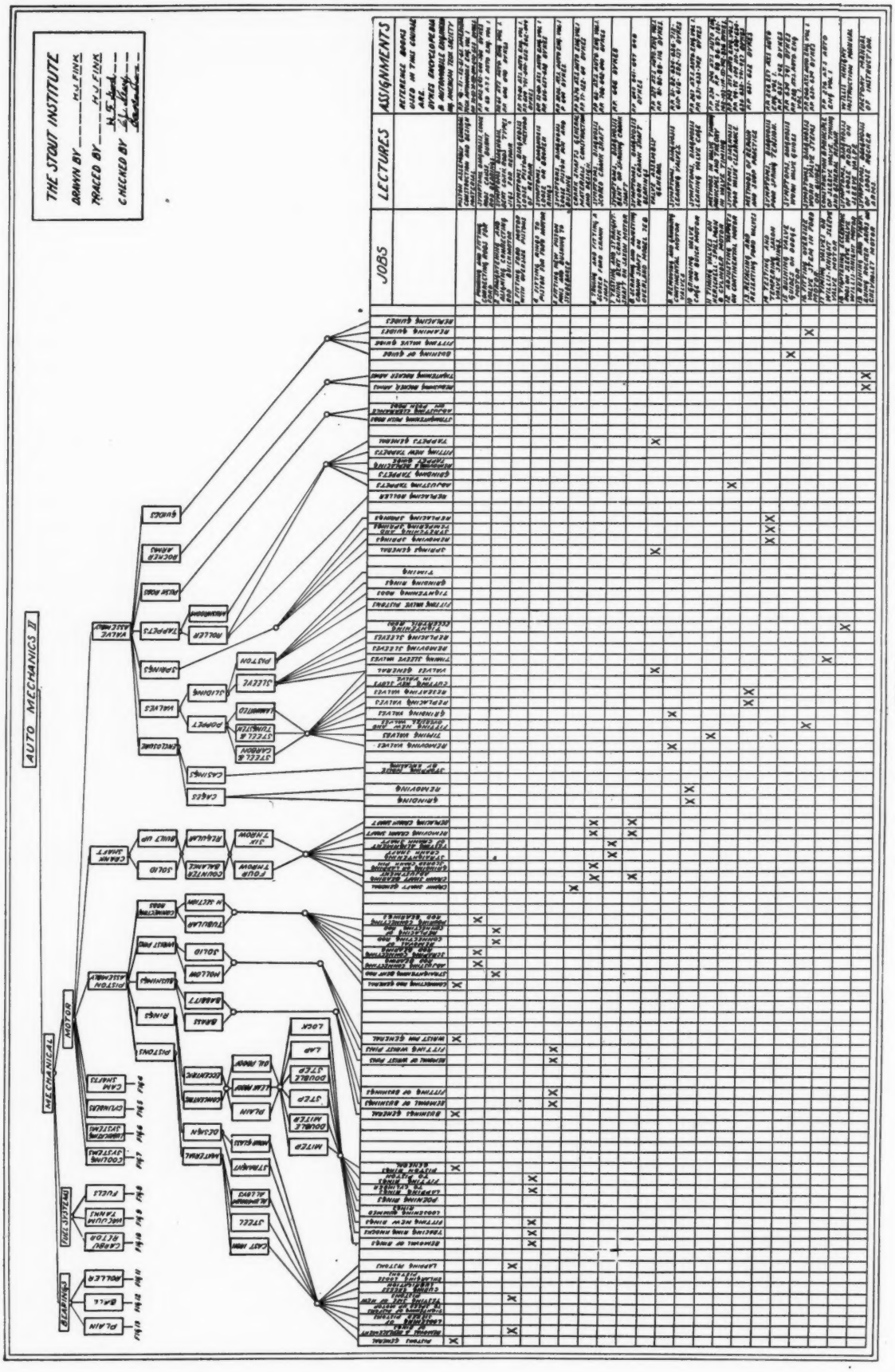


FIG. A.


THE STOUT INSTITUTE
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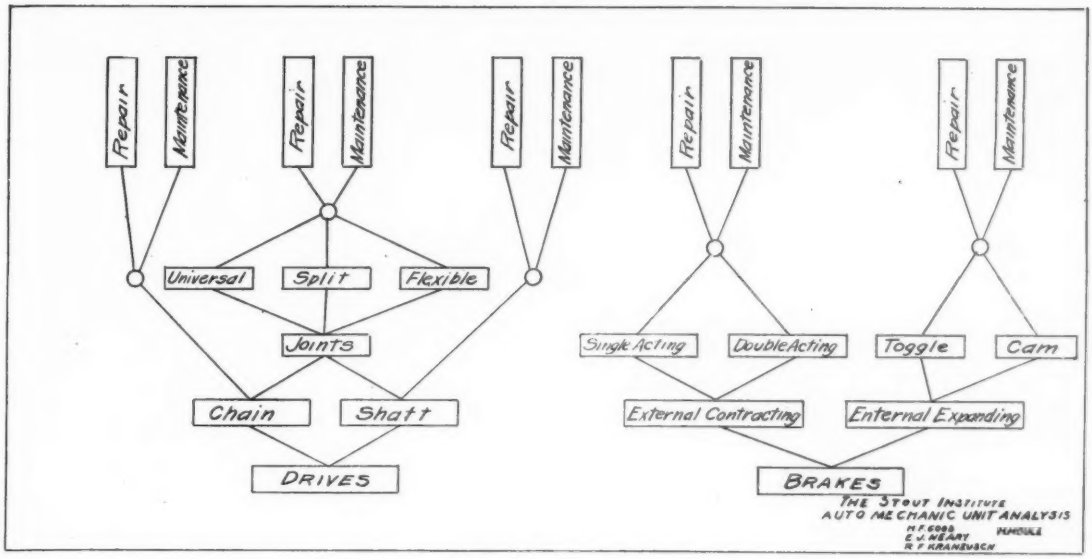
AUTO MECHANICS II
MECHANICAL
MOTOR
BEARINGS
ASSIGNMENTS
LECTURES
JOBS

FIG. II.



FIGS. F AND D.

assignments of jobs are then listed as indicated on the large chart for unit courses.

Figure I is headed "auto mechanics I" and Figure II is headed "auto mechanics II" simply because in our apportionment of time it is productive of better results to group in one course frames, springs, wheels, steering gears, front axles, rear axles, brakes, fenders, driver, clutches, transmission, tires. and body parts, and to group in another course, bearings. carburetor, vacuum tanks, fuels, cooling systems, lubricating systems, cylinders, cam shafts, piston assembly, crank shafts, valve assembly. Courses headed "auto mechanics III" on the electrical phases of auto mechanics and "auto mechanics IV" on the complete application of the units in the above total in overhauling are available.

In the development of the vocational teacher of auto mechanics (or in any other trade) the completion of the upper left portion of the chart carries him through the recognition of the total breadth of unit divisions of his trade. This recognition of units is so arranged that the listed units are in convenient divisions so far as content is concerned and also so far as teaching separate units is concerned. The chart used by the teacher may be by separate units or by groups of units, whichever is most convenient for the type of classes being taught.

In the development of the columns at the right in Figures I and II different headings seem most useful as different trades are worked through. In auto mechanics it has seemed most convenient to use those listed. Under the heading "jobs" are listed the assignments of work to be given to a class in the shop or to individuals in a small group. In the next column headed "lectures" are indicated the kinds of informa-

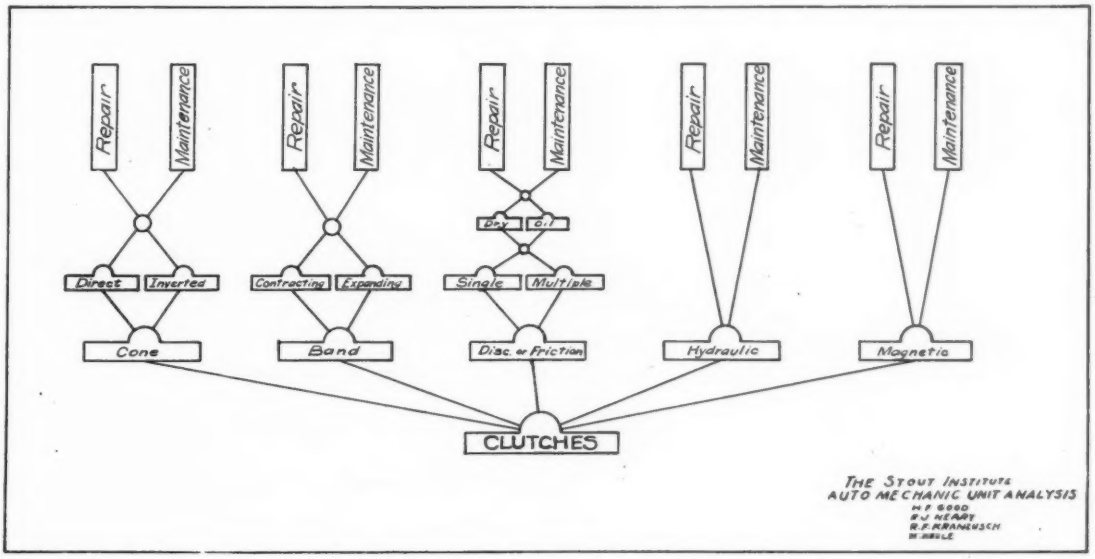


FIG. G.

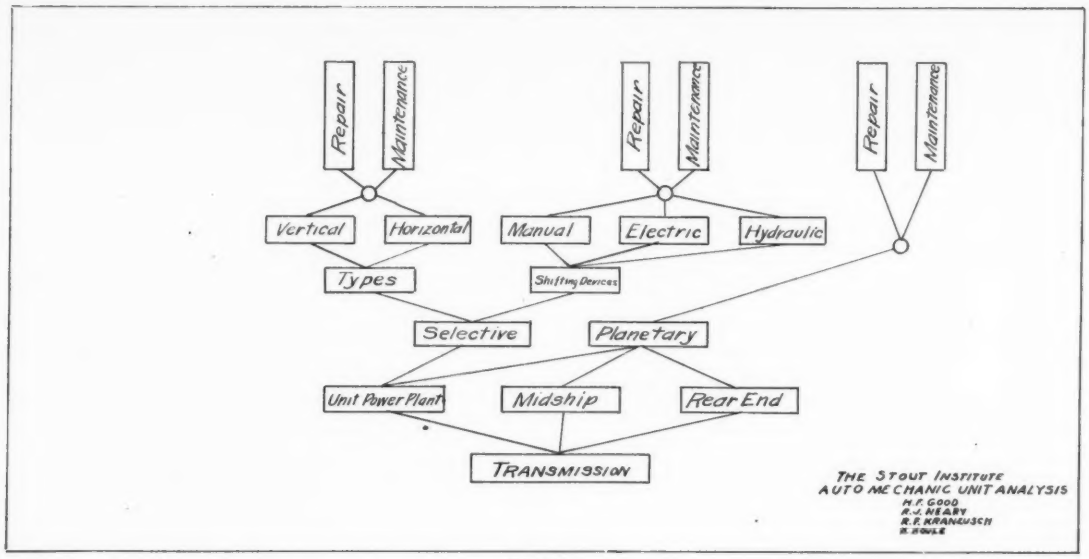


FIG. H.

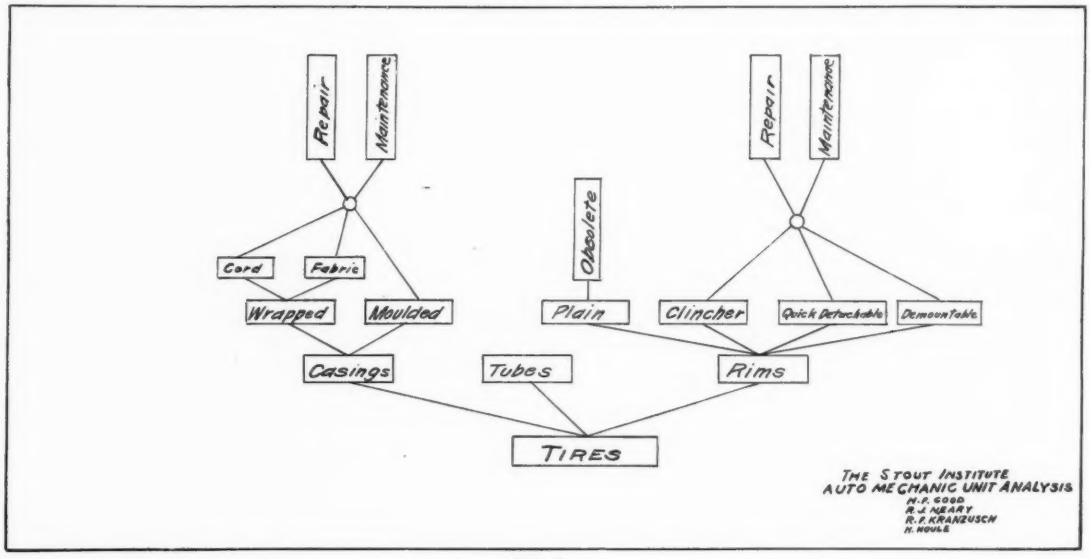


FIG. J.

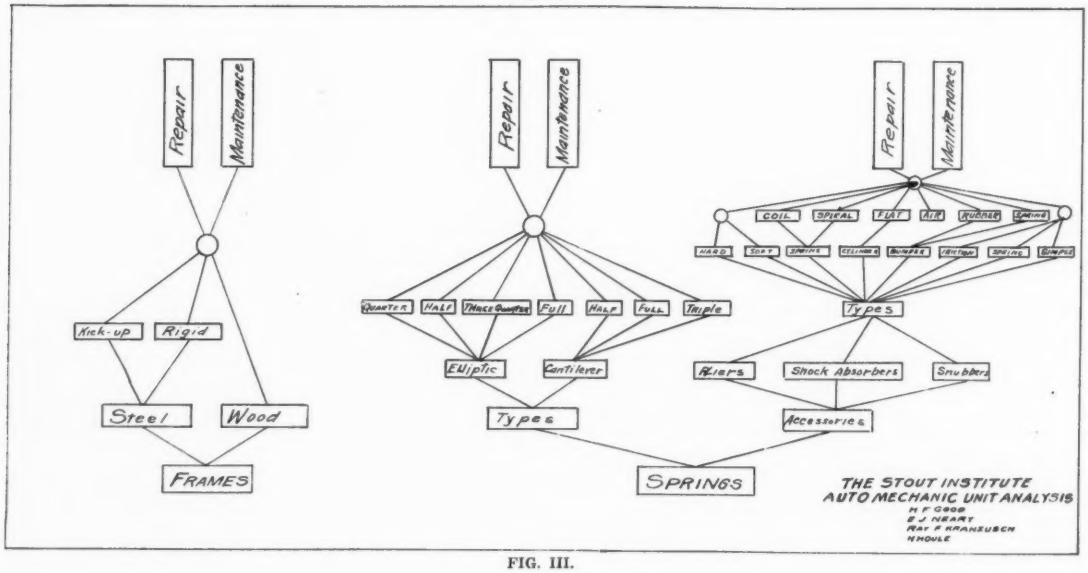


FIG. III.

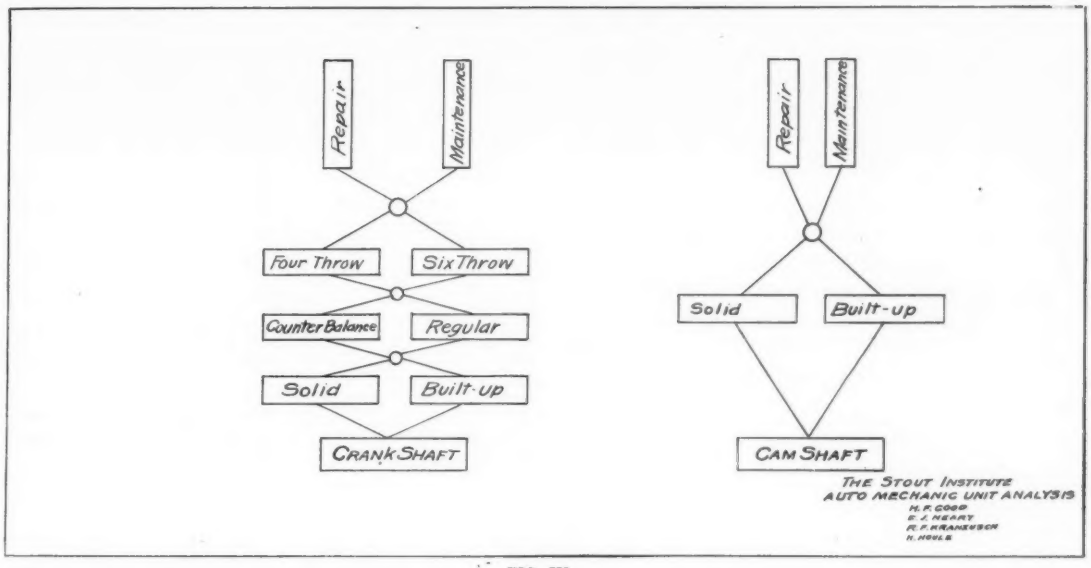


FIG. IV.

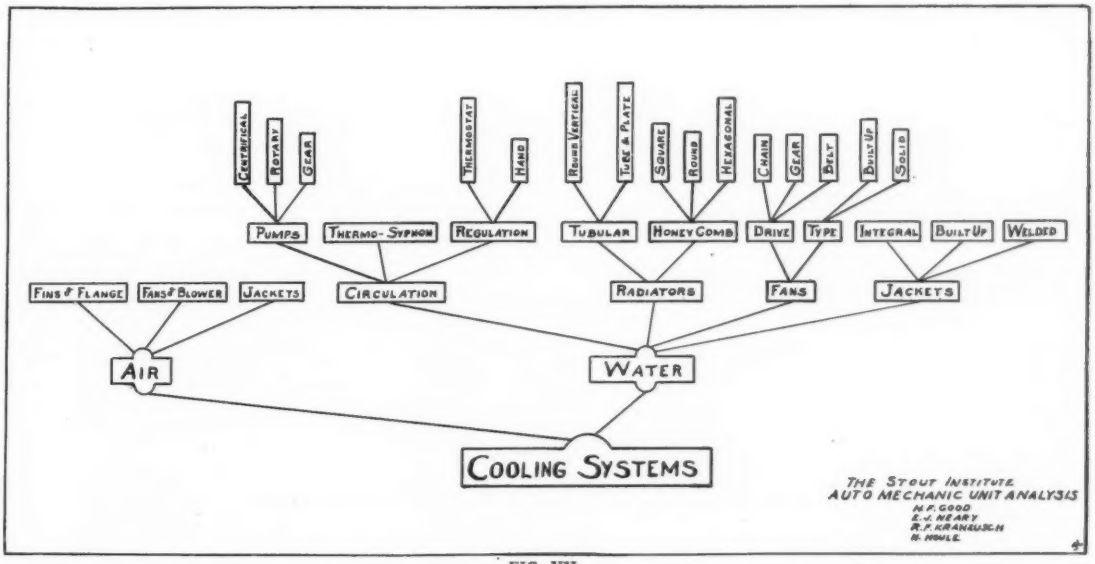


FIG. VII.

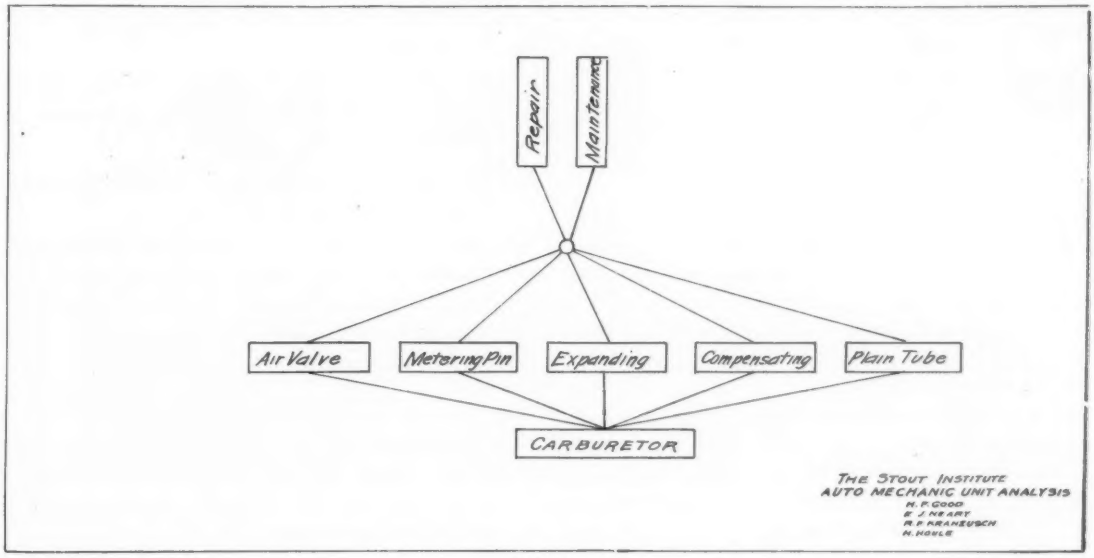


FIG. X.

tion to be explained to the group or the individual. This column may be headed "shop talks," "symptoms" or whatever is most acceptable. In an auto mechanics repair job one very important part of the episode of the job is the proper interpretation of the symptoms. In other words, the situation in the car, the "pathological condition," must be such as to warrant the doing of the job. An operation for appendicitis is not to be done when bicarbonate of soda is what is needed. The next column headed "assignments" is used in the present case for the reading to be covered in connection with the talks listed under the second column and the jobs in the first column.

If the equipment in the hands of a given teacher is such as when considered in connection with his classes he wants a different set of jobs and assignments, then all that is necessary is to paste a slip over the items included in the three columns in the charts and list his own. Under "Jobs" can be put the numbers of the jobs he is assigning. With these entered opposite his Job No. 1 he can check those basic things done in the occupation which he sees are involved in his job No. 1. This can be done for the second job, for the third, etc., until he has checked all of the jobs for the group he is teaching. For a pupil who has covered one or more jobs it is clearly indicated in what work he has had experience.

Figures I and II are made out as sample selections and therefore carry three of the units broken down to basic things done. Those units which are not broken down are referred to by figure numbers. In these other figures the sample analysis is carried down to, but not including, the basic things accomplished. As has been

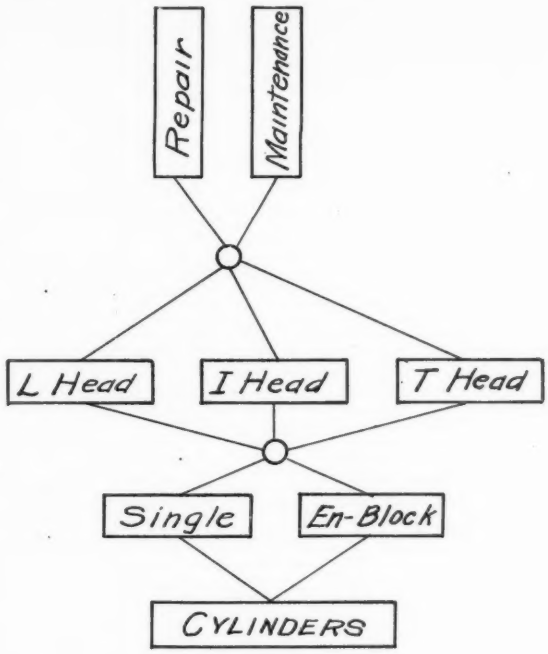


FIG. V.

previously mentioned in this article, one unit or more can be included in the chart according to the grouping of pupils and the size of classes. The jobs listed in Figures I and II are selected to involve the units broken down to basic things accomplished on these charts. The charts are simply graphic layouts calling for "what must be known" in a series of lesson plans and pointing the way for indexing and selecting the "what must be known."

Paint Shop Varnish Practice

Ralph G. Waring, Syracuse, N. Y.

THERE appears to be so much confusion regarding the common terms employed in varnish practice that perhaps a little explanation, by way of introduction to the present article, may not come amiss.

"Copal," like Smith and Jones, is a name only, and boasts as many relatives as do either of the other two. It is supposed to represent a superior grade of "gum" or hardened resin which is the base of most varnishes. Historically it would appear that the name was first used in France. Later research has developed facts tending to prove that practically all varnish resins come from the east coast of Africa, but the term "copal," originally confined to the resins which the Arabs carried to Bombay and Calcutta, there to be dispersed over the markets of the world, soon became applied to other resins, so that at the present day it has become a generic term for any and all resins, amber excepted—fossil and recent, suitable for varnish making.

The hard copals include Zanzibar, Mozambique, and Madagascar.

The medium or semi-hard types are West African, Gold Coast, Angola, Benguela, Congo (Gaboon), and Sierra Leone.

The soft copals include Kauri, Manilla, and Borneo, all of which are peculiarly odorous.

The major portions of these gums are fossilized, and in some places are washed up during storms from subterranean forest deposits. In New Zealand the Kauri gum is now being mined systematically by the British Government, using apparatus similar to our California and Nome gold dredges. Old deposits formerly worked out by the natives are now being subjected to a distillation process whereby from ten to twelve gallons of "Kauri oil" are being recovered from each ton of dirt handled, this oil being valuable as a solvent in varnish making processes.

Our next constituent of a high grade varnish is its oil content. From time immemorial, linseed oil has been employed as a binder for the gums in oil varnishes. Used alone, however, linseed oil produces a rather soft film of a slightly porous nature. Of later years, new processes for purification of Chinese wood oil, or Tung oil, have enabled varnish makers to employ this oil of great technical value; since with it they can produce much finer varnishes from cheaper materials than has hitherto been considered possible. In fact, it has completely changed the terms of technical varnish specifications, since rosin, formerly considered an adulterant in varnishes, when employed with Tung oil, produces an extremely fine product of superior water resisting and high gloss qualities.

Last of all, the varnish must be thinned to enable it to "flow" or "spread." Formerly turpentine, or "turps," as it is known in the trade, was used, but today has become too expensive to be used in any quantity greater than that necessary to give the varnish a turpentine smell, which some buyers demand. The Standard Oil Co. produces a petroleum product known as varnolene which is now used almost entirely in oil varnish making in place of turps.

Briefly, varnish making consists in putting a weighed amount of Kauri gum, for example, in a varnish kettle, which is now pushed over a coke fire in the floor. The gum is melted or "run" until it is of a definite consistency and temperature. It is then withdrawn from the fire and a definite amount of varnish makers' prepared oil, which has been heated, is then added. Foaming sometimes occurs and a large paddle is used to stir down the foam. The kettle is then placed over the fire again and the cooking process is resumed until a drop of the combined oil and gum form a "pill" of definite form and hardness when dropped from the paddle to a sheet of glass. When the cooking process is complete according to the varnish maker's experience, the kettle is run off and cooled below the flash point of the reducer which is then added and stirred in. Allowed to stand until nearly cool, the mixture is pumped into receiving tanks and stored. Before being sold it is run through a filter press, or clarifier, until a perfectly uniform and clean product is ready for use.

Either during the cooking process, or during the pumping operation, some form of metallic drier, as cobalt linoleate (or the linseed-oil soap of cobalt) is added to make the varnish dry more rapidly and uniformly throughout.

The whole varnish industry is extremely technical and involved in its operation. Some results are obtained which are little understood, but have been produced through much practice and experimentation. It offers a tremendous field for those whose ambitions lead them to believe their life work lies in that direction.

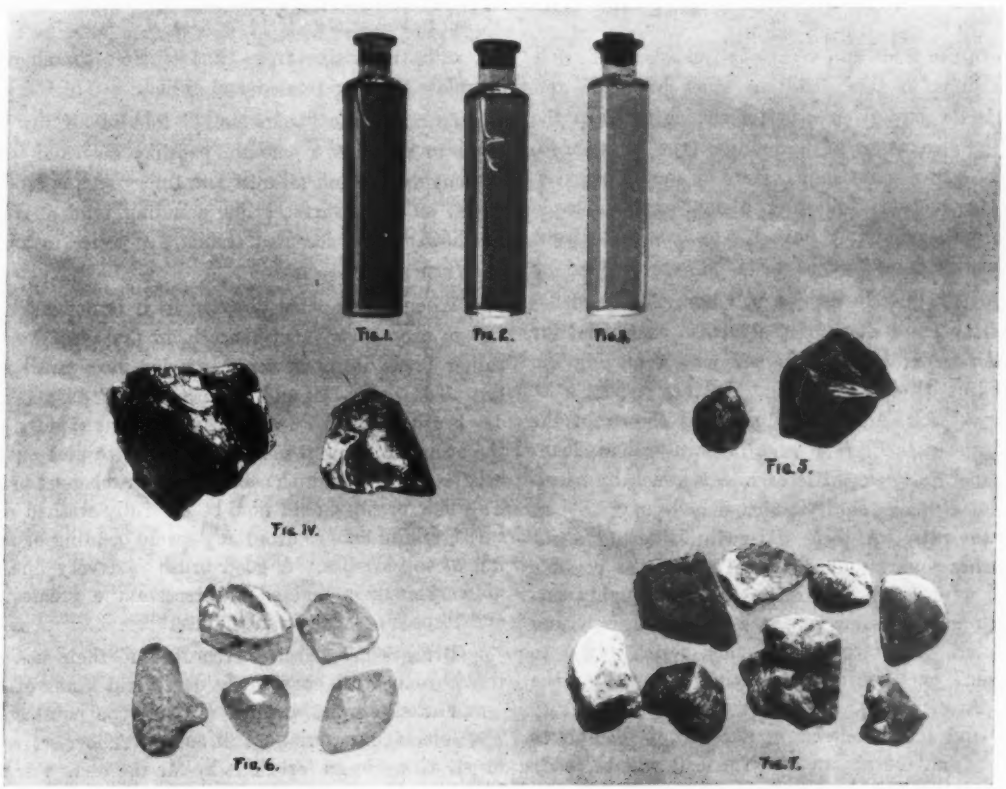


PLATE I.
Fig. 1—China or Tung, Wood-oil. Fig. 2—Linseed oil. Fig. 3—Reducer. Fig. 4—Manilla gum. Fig. 5—Pontianack gum. Fig. 6—Congo gum. Fig. 7—Kawii gum.

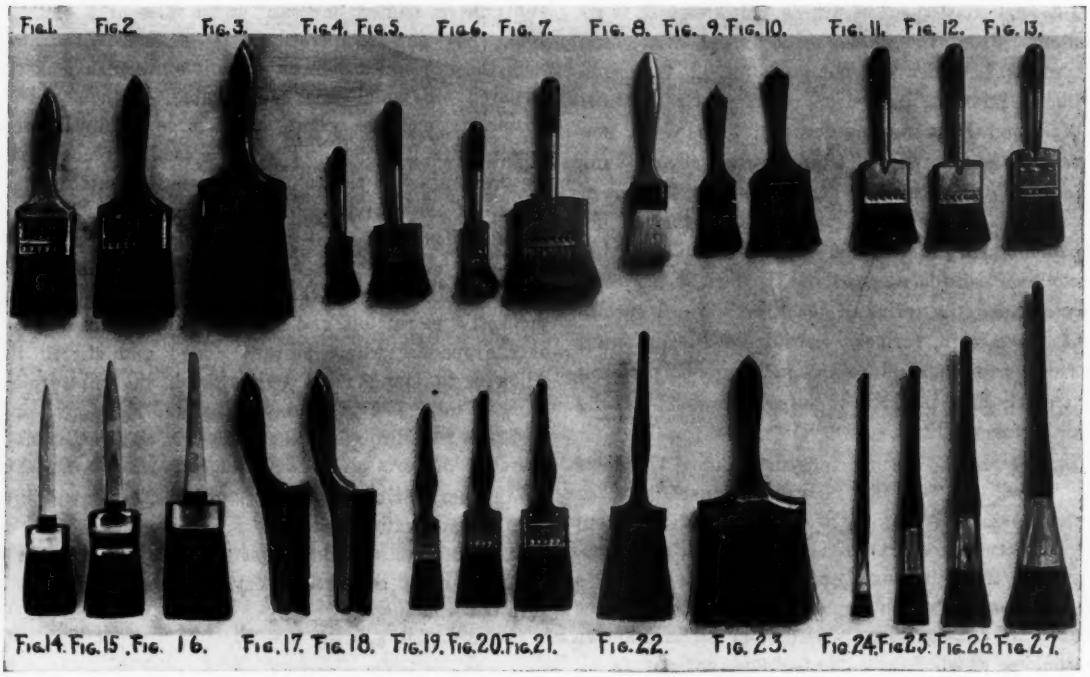


Fig.1. Fig.2. Fig.3. Fig.4. Fig.5. Fig.6. Fig. 7. Fig. 8. Fig. 9. Fig. 10. Fig. 11. Fig. 12. Fig. 13.
Fig.14. Fig.15. Fig. 16. Fig.17. Fig.18. Fig.19. Fig.20. Fig.21. Fig.22. Fig. 23. Fig 24. Fig 25. Fig 26. Fig 27.

PLATE II. STANDARD BRUSH EQUIPMENT FOR THE PAINT SHOP.

Figs. 1-2-3. Flat wall brushes R2159—Black China Bristle 2½", 60c; 3", 80c; 3½", $1.

Figs. 4-5. Varnish Brushes—Fitch Flowing. 1", 70c; 2", $1.15.

Figs. 6-7. Varnish Brushes. Badger hair, heavy body. 1", $1.50; 3", $4.25.

Fig. 8. Varnish Brush. French White Bristle. 1½", $1.40.

Figs. 9-10. Varnish Brush—Camel hair flowing. 1½", 80c; 2½" $1.35.

Figs. 11-12-13. Varnish Brush—Oxhair flowing. 1½", $1.65; 2", $2.20; 3", $4.

Figs. 14-15-16. Outside Paint-Varnish Brush. "Admiral." No. 2", $1.20; No. 6", $2.05; No. 8", $3.30.

Figs. 17-18. Varnished moulding rubbing brush, brass bound bristle. ½", 80c; 1", $1.15.

Figs. 19-20-21. Varnish or Paint Brush Chisel. Black China Bristle. 1", 45c; 2", 90c; 2½", $1.30.

Figs. 22-23. Dusters, Mule Hair. 3" Round, $1.15; 4" Flat, $1.15.

Figs. 24-25-26-27. Sash Tools, Black China Bristle. ½", 30c; 1", 40c; 2", 50c; 3", 95c.

It is in the trade and vocational schools, then, that the beginnings in this direction must be made and nowhere is the boy given a better chance to learn the practical requirements of a definite type of varnish, than in the school paint shop. Here he should be given accurate instruction, following along accepted trade practices, and not simply have his lessons handed out in homeopathic doses "out of a can."

In our last article the job had been filled and delivered to the paint shop for the varnish coats, and for that reason we are next concerned with removing the dust and lint before varnishing. In this respect a 3" round, or 4" flat, mule-hair duster, as shown in the plate of brushes as Figs. 22 and 23, is useful in cleaning out panel lines, etc. However, it is generally necessary to use a "tacky cloth" which may be prepared in one of two ways. A piece of muslin sheeting about twelve inches square and as free from lint as possible should be wrung out in varnish until thoroughly saturated in much the same way as a wash cloth is wrung out of water. The second, and much better way is to use "bodied" or "Venice" turpentine in place of the varnish. After using, the cloth may be rolled up smoothly and then enclosed in a cover of oilcloth to keep away from the air, in which case it will be ready at any time for several months, whereas the varnish tacky-cloth is good for once only. It should be washed out with turpentine from time to time to remove accumulated lint, retreated and rolled.

In using the "tacky-cloth," fold in all raw edges so as to use only a smooth, pad-like face and with it thoroughly wipe off all dust and lint. This is especially useful on large surfaces like standing trim doors, and has now become accepted standard practice in automobile furniture factories.

Whenever possible to avoid it, it is not good practice to use a new varnish brush on first-class work but rather break it in on some inferior piece until it has lost all loose bristles and varnish makers' dust. A new, dry brush should be worked carefully but rapidly across the opened fingers in such a manner as to flick out loose bristles and dust, which occur even in rubber-set brushes. The new brush should now be carefully washed out in turps, taking care to avoid any severe bending or straining of the bristles. A good brush is a very fine piece of workmanship and should receive the greatest care and respect possible from the user.

Brushes are selected according to their usage, although one brush may easily do several kinds of work.

For all-around varnish work in the paint shop, a 2½" black China bristle, full bodied, rubber-set varnish brush with a brass ferrule is by far the best. For better work, as for instance, the last coat work on cabinet work over a water rubbed under coat, a "fitch flowing" or

"ox hair flowing" brush is ideal. For those who feel themselves unable to work properly unless the brush is rather heavy and stiff, a full bodied badger hair is recommended. Camel's hair brushes are not suited to anything but the very finest and lightest bodied varnishes as "auto wearing body" or violin varnish which are not much heavier than kerosene. The finest brush of all, of course, is the "French white bristle," the material of which comes from the wild boar of Russia. For contract work on standing trim or general inside trim and floor finishing the "pound oval," or number 6-0 or 8-0 "Admiral" outside paint brush is a splendid tool, as it possesses just the right amount of body and flexibility together with proper weight. If the tin bridle is used, as shown in Fig. 15, it should be removed once in a while to prevent any varnish from hardening beneath it while the brush is not in use. While the bridle is off, wash out the brush carefully with turps, using a narrow putty knife to work out the turps in much the same manner as a comb would be handled. *New brushes should be kept in their wrappers in a cool and not too dry place, until needed.*

Regardless, however, of the brushes used, it is absolutely necessary that they be in proper condition at all times for their work. Some arrangement, as shown in Plate 3, experience has shown to be very necessary and practical. The can is made of 40 pound tin and is four inches deep, six inches wide, twelve inches high in back and eleven inches high in front with a cover one inch deep. Two small slotted stirrups, soldered to the inside faces of the can, receive the ends of the wire on which the brush handles are run, and are raised high enough from the bottom of the can so that there is not less than one inch clearance for the bristles. The can should be filled with turps to such a point that it will cover part of the ferrule when the brushes are in place. Originally lath nails were soldered on each inside face of the can and the brush handles run on them, but usage developed the fact that varnish collected between the can and brush and hardened enough to make the brush "mealy" and therefore unusable, necessitating cleaning with varnish remover. The brushes shown are ox hair, 2″; French white bristle, 2½″; badger hair, 3″; and black China, 1½″, giving a full range of utility, for either special cabinet work or special varnishes of different bodies.

Good brushes and suitable brush cans are essential equipment, but a very useful and necessary adjunct to the paint shop is the varnish pan, of which the form illustrated has been developed through much careful study and changes from several types. It is 1½″ inches deep and five inches in diameter. The wiping wire is set in 1½ inches from the rim so as to give a 4½-inch clear edge on which to wipe off all excess varnish from the brush. It should be so bent at the right hand end that when the handle loop is in the position shown, spring pressure enough should be exerted to keep it in place during use, but permit its easy removal for cleaning. A permanent wipe-wire proves to be a nuisance due to varnish collecting and hardening around the ends. The rim of the pan should be wired, the bottom lapped, and all seams sweat. Where a wipe-wire of this type is left off the pan, the outside soon becomes covered with dripping varnish with generally sloppy work as the result. All excess varnish left from work should be poured into the brush-can in order that the turps will gradually become part varnish. This method does away with small wastage and keeps the brushes in better condition, as well as affording a fresh varnish pan, since it should be put to soak in a pail of turps (covered) until ready to use. It may then be emptied of excess turpentine but should *not* be wiped dry with a cloth. If this is done much lint will be left on the pan to later find its way into the varnish.

PLATE 3. BRUSH BOX (RIGHT). BRUSH HOLDER AND VARNISH CAN.

It is taken for granted, of course, that the varnish room has been swept and mopped at least two hours before use. It is also a distinct advantage to thoroughly oil mop the floor, using paraffine oil, which will materially control the dust nuisance, if done once a week.

The operator should at least wear a clean apron and shop cap to prevent particles falling from the hair. The sleeves should always be rolled up, and in factory work the men generally oil their arms to prevent any varnish spots from hardening and sticking during the rush of piece work. Vaseline or cheap petrolatum is ideal for this work, but neither oil nor vaseline should remain on the hands, otherwise oil spots will result where the varnish will not harden.

A Few Simple Art Principles of Value to Every Industrial-Arts Teacher

Margaret Cecil Wise and Helen Marie Stockton, Trenton Normal School

FEW people know instinctively how to achieve beauty. The writer knows a woman who spent several thousands of dollars for a rug, and many thousands more on antique furniture, but for certain reasons the general effect produced was not beautiful. On the other hand, a woman of unkempt neighborhood, her house crowded and littered, made her attempt by placing huge and lovely flowering plants in her window, but the sum total was not art, and her house was not a home any more than that of the lady of the rug and the antiques. We are not like the Japanese, a people trained from earliest childhood to the appreciation of color and line.

It is the purpose of this article to put into the possession of the many teachers included under the head of Industrial Arts a few simple principles which will act as a guide in the great struggle for more and better art. It is hoped that these teachers will not pass these principles on to their pupils, as illusive phantoms, abstract formulas, as has so often been done in the past, but that they will present them as concrete realities.

Line naturally comes first since structure must be considered before ornament. To begin with, in order to arrange furniture or rugs, to hang pictures or curtains intelligently, a person should have a certain knowledge of what line means and what the different kinds of line stand for. For instance, horizontal lines mean rest, vertical lines express dignity, and oblique lines are lines of rapid action.

Every room has what we call structural lines. These are the corner lines, the ceiling lines, the baseboard, and the lines formed by the doors and the windows. These lines are horizontal and vertical. Now all these parallel lines produce rhythm and harmony as they also produce rest and orderliness. Therefore, the structural lines should be repeated in as many ways as possible. This is the reason that curtains should be hung straight from the top, for then the window presents four long parallel lines which are parallel to the corners again, making the room more rhythmical and harmonious.

If curtains are tied back you get oblique lines which, as has been said, are lines of rapid action, and these interfere with the peaceful atmosphere you wish to produce. Curtains are very important accessories. It has been said that a room without them is like a man without a collar. In any case, many an individual feeling how much curtains should add, has wondered why hers have not produced better effect, not realizing that the little cord or rope or ribbon, looping them back, has spoiled any chance for good line or for an artistic window.

Now for the arrangement of furniture! Once upon a time there was a certain youthful bride who changed her furniture around at least once a week. One just became accustomed to a fairly good arrangement when the scene was abruptly reorganized. Even the piano was pulled and hauled from one side of the room to the other.

In reply to the jocular remark of a masculine relative about "moving going on all the time," she said, "Well, I'm never quite satisfied any way I fix things. It's this old furniture we inherited from Bill's mother! Some day I hope we'll get some new stuff."

The trouble was that she had not even average understanding of what makes for correct arrangement. When she had "fixed things" she had an irritated feeling that something was wrong; but she knew no rule by which to correct her scheme. Her lack of power was due to lack of knowledge.

She should have placed her largest piece of furniture against the largest wall—flush against this wall, and not across a corner. Crossing corners again interferes with the parallel lines. Naturally she might not have been able to follow this principle at every point, for the question of convenience should receive consideration. Where a piece of furniture is absolutely necessary to a room, and can be used only in a cat-a-cornered position, well and good. But at best such arrangement is unfortunate. Of course, after the main pieces are accounted for, the room may be filled in informally.

The placing of rugs falls under the same law. Generally speaking, there should be no zig-zag arrangement. A square room should have a square rug, an oblong room one conforming to its own shape.

Much that has been said about the placing of furniture applies to the placing and hanging of pictures. The largest picture should go on the largest wall, and on the wall nearest that picture in shape. A picture should be hung blind, that is, with no wire showing. Sometimes this is not feasible as in the case of a large heavy picture. Such should be hung from the molding by two vertical wires. When hung from a single nail, two oblique rapid action lines are produced which not only interfere with the lines of the room, but also with the composition of the picture itself.

The artist designs his picture primarily with regard to the general effect he wishes to produce. Suppose the feeling he wishes to give is rest, peace, solitude. That is his remote desire. Perhaps his more immediate aim is to paint a placid river, a clump of trees with low-swinging branches, an empty boat on the grassy slope, hills in the distance.

The painter would place this scene upon an oblong horizontal canvas, for horizontal lines always mean rest. Always, the artist manages to arrange the shape of his picture to fit the ultimate feeling he wishes to produce.

A tall vertical picture, on the other hand, gives the idea of dignity. Most madonnas are of this composition—the Sistine Madonna, to give a well-known example, or again, DaVinci's "Mona Lisa." Here we are presented with immobility, with dignity. The attention is sharply commanded.

What happens when a picture is not framed with regard to its own composition, in conformity with its own shape, is obvious. Yet we find in many schoolrooms as well as in many homes, pictures portraying rest and dignity hung by oblique wires. Art cannot be really felt in such an atmosphere.

While not coming within the subject of line, a few words on appropriateness to purpose, one of the greatest of all principles of art, are in point here. By appropriateness to purpose is meant that furnishing should be as suggestive as possible of the purpose of a room. In other words, a room should look like what it is. It should embody the idea of its function. A dining-room should not contain a sofa, a lounging chair, a desk. The living-room must look like a place in which to rest or read. It should not be covered with trophies like a museum.

Not that variations in arrangement may not at times be permissible. Such variations are for the expert to deal with, the trained interior decorator, who knows under what conditions curtains may be looped, or the small rug placed zig-zag. But this article does not deal with variations; its concern is a few fundamental principles upon which all art is founded.

How can we Industrial Arts teachers popularize these principles to the end that the American home and home-life be richer and fuller of beauty?

Vitalizing Manual Training

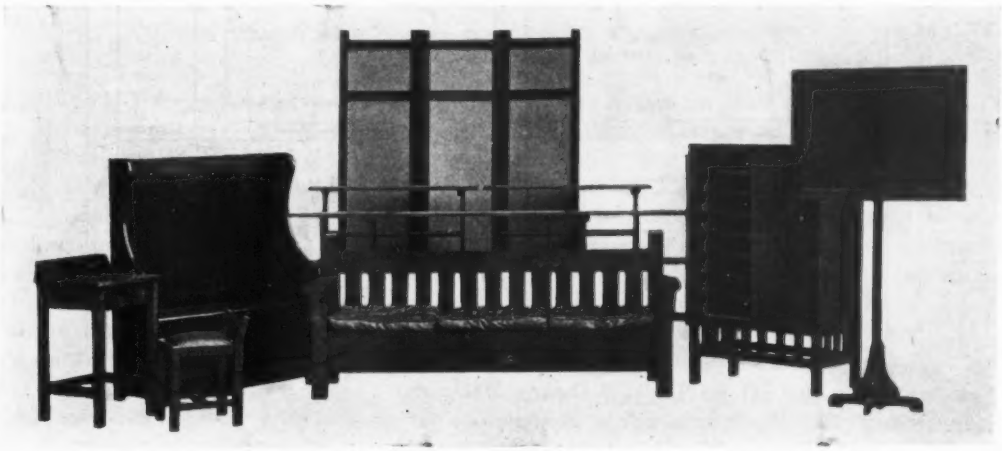
Cornelius Abbott, Indianapolis

AFTER seventeen years of teaching, ten years of which have been spent as an instructor of industrial arts, I have come to the very definite conclusion that the average wide-awake boy, even in the earliest period of his training, can be made to appreciate, to some extent, the viewpoint of the artisan and can see the possibility and the necessity for constructing a piece of work that will compare favorably with that offered for sale on the market.

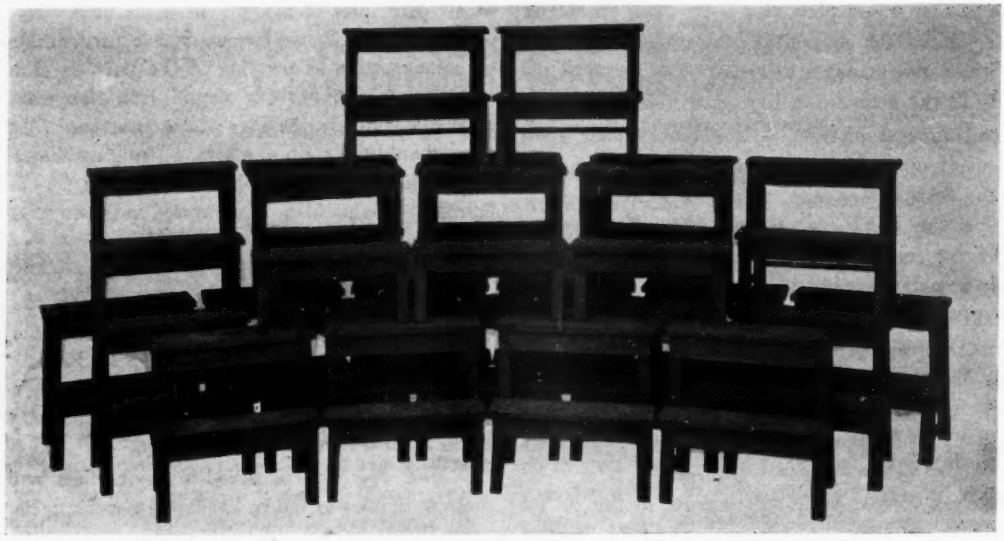
I realize that it is not the finished product which is of greatest importance. The goal is the intangible something which he acquires, plus certain habits formed by the proper coordination of mind and body. No industrial work can be of any value unless interest is created and maintained in both the instructor and the pupil.

Nothing is more important in industrial work than that the problems of the shop shall be linked with other phases of school life or with the home. The two large settles shown in the picture were designed by the art class and were made by the same boys in the shop. Utility has been the determining factor in choosing many of the projects which we made during the year.

The boys should be taught to appreciate the fact that they must thoroughly plan jobs and get them done on time. This makes them think along constructive lines and they execute their plans. Materials are studied so that there is a familiarity with the various parts which make up the whole and the boy sees the definite purpose and definite result. With this comes skill acquired in doing the task; he has developed ability and that ability may be used in the construction of other projects. With orderly procedure, accuracy, neatness,



SCHOOL FURNITURE MADE BY BOYS AT WILLIAM A. BELL SCHOOL, INDIANAPOLIS.



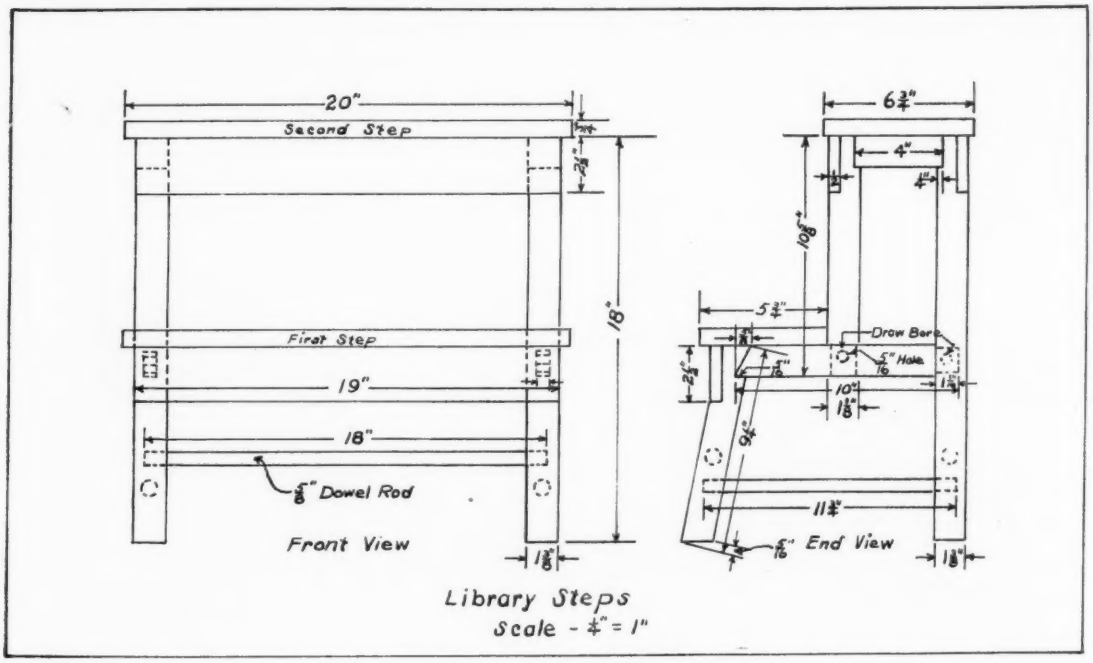
LIBRARY STEPS.

promptness, and industry, not idleness and dependence, become the goal.

In order that my students may more clearly appreciate their parts in the whole shop scheme, I organize each of my classes into what one might call an industrial body or company. From their number the students select a shop foreman, a supervisor of the tool cage, monitors, and a checker of the bench tools. They also choose four boys to clean the shop and three others to make out marks for the entire class.

Nothing I have ever planned has worked to better advantage than the tool cages. Under my supervision the boys have built cages at both of my schools. The cage in the photograph was built by the boys at the James Whitcomb Riley School. The tools are checked out and each student is responsible for every tool he takes out. The boy in the cage does not idle his time away as he must keep the little room clean and neat and must keep all supplies in perfect order. Quite frequently he assists me in making drawings.

The monitors collect the project material and are held responsible for it each day. Those who clean the shop and pick up the shavings, leave the room in perfect order. The class is dismissed by an electric bell op-



DETAILS OF LIBRARY STEPS.

erated by the boy in the tool cage and the boys march out in perfect order to their classrooms or to the playground.

In producing the school steps and other articles in the illustrations the work was so organized that each boy had a definite job to perform and was held responsible for accuracy in doing it. Jigs were made where there were many duplicate parts to be constructed. The school steps were made by eighth grade classes and were built and ready to be delivered in four weeks, working three hours each week. The work could never have been accomplished in that time if it had not been for the use of many jigs, some of which were used on a power saw constructed by myself with the aid of the pupils.

At the William A. Bell School we have a print shop and the students, under the direction of Mr. Orlando Little, print a school paper. The proceeds are sufficient to buy supplies for the print shop and almost all of the wood for the construction of the school projects.

TOOL CAGE IN THE JAMES WHITCOMB RILEY SCHOOL, INDIANAPOLIS.

BOYS CUTTING TENONS ON SAW WITH A JIG. IT WAS IMPOSSIBLE FOR A BOY TO GET HURT.

During the year just closed the students have made the following projects: tool cage, bulletin board for the shop, pedestal bulletin board for the school, three picture frames for charts, two frames for blackboards in the shop, a cabinet for supplies, an oak settle, 25 school steps, 23 book shelves, three panel screens for the dining room, three window screens for the dining room, a large cabinet for the night school, window ventilators for the school and fourteen music stands.

The list of problems represent a saving to the school commissioners of nearly $300, but that is not the real value of the work. The student sees more clearly his relation to society and becomes a better citizen, this being the true end of all our work.

Cement Work as a Therapeutic Occupation for Men

Louis J. Haas, Bloomingdale Hospital, White Plains, N. Y.

(Continued from December.)

PLATE 8 shows the parts necessary for the making of one of the innumerable cement vases, which can be turned on the cement turning-mill (see Plate 9). There are eight of these parts. The first of these, the core shown in Drawing A, is a galvanized iron covered skeleton composed of two rings placed upon a shaft or striking rod, being held in place by cross braces, as shown in the drawing. The conical casing of No. 20 gauge galvanized iron, has a close and smoothly soldered joint, and is practically blind riveted to the rings. The cap fits just inside its edge and is soldered in place.

Drawing B shows the core plate, which is made of one-inch oiled cypress. Two other rings, the core ring, Drawing C, and the stock supporting ring, Drawing E, are made of cross-grained wood, as explained by the drawing. These rings are faced with galvanized iron. Note how the stock supporting ring is divided into two halves, the galvanized facing extending on one side so as to bridge the gap left for the removal of the supporting key shown in Drawing D. The hole at the other side of this ring makes it possible to use a drift to remove the key.

To assemble the parts for turning a pot or vase proceed thus: Place the core plate over the driving spindle of the turning mill table, and around the core plate place the core ring. Next insert the supporting key, and upon it and in place within the core ring, set

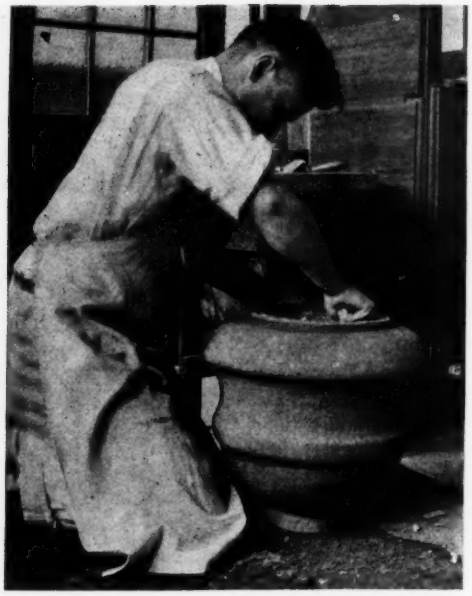


PLATE 8A. CEMENT VASE IN CONSTRUCTION.

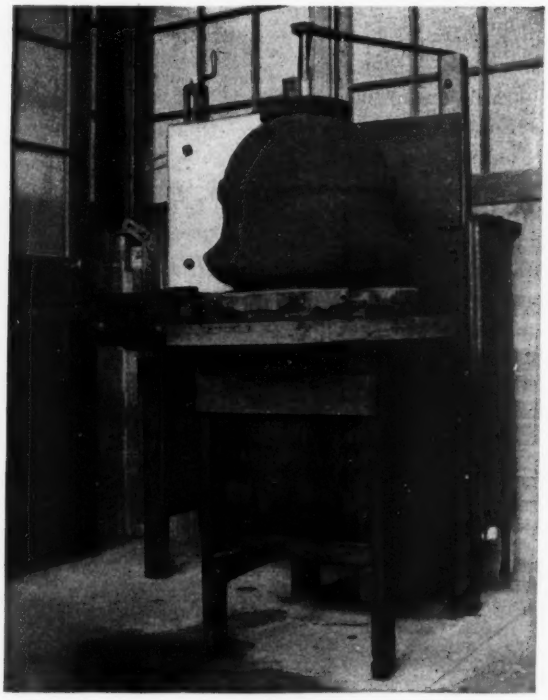


PLATE 9A. CEMENT TURNING MILL WITH TEMPLET AND VASE IN POSITION.

the core cone. Place the top stay brace over the striking rod (see Plate 9), and the turning of the core may be started. Potter's clay was packed about the core cone and then the core templet attached to the tool rest,

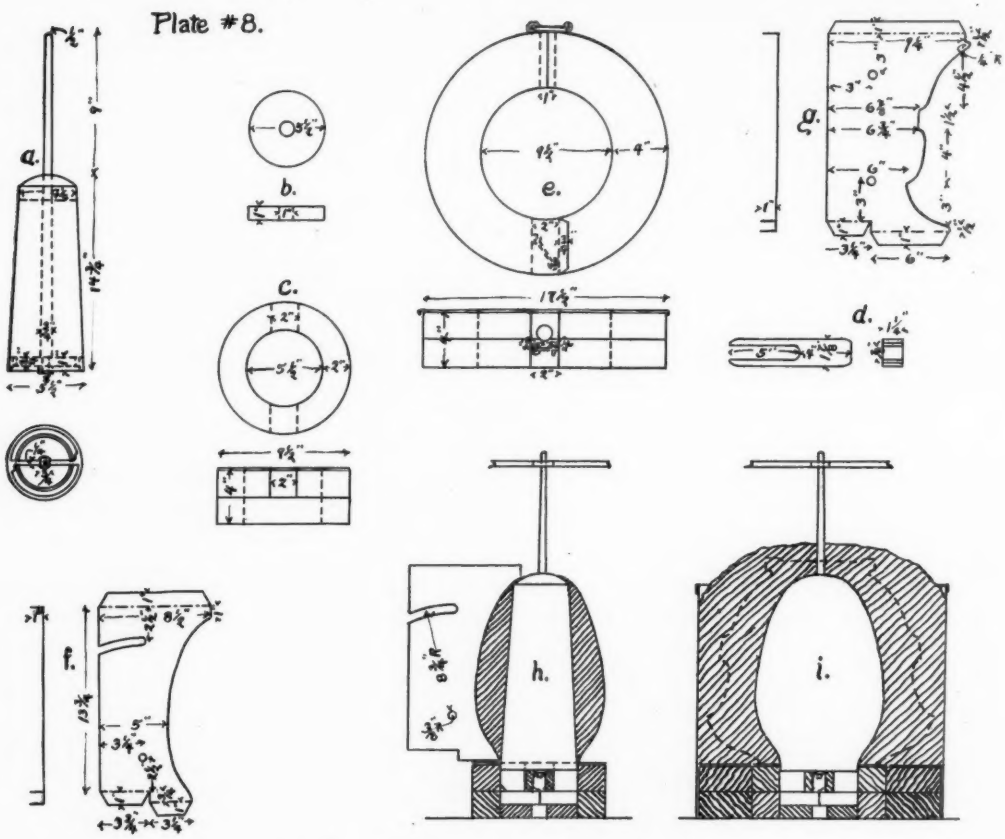


PLATE 8. DETAILS OF MAKING CEMENT VASE.

by the two retaining bolts, placing the templet stays in such position as to support the templet at the points of greatest stress. Then the mill was started and the templet brought into cutting position with the lead screw, and slowly cut the clay off until the clay core presented the appearance shown by Drawing "h." After clearing all the surplus clay from the turning mill table and core ring, the cement stock supporting ring was placed about the core ring and locked securely. This ring was so placed, that the gap in the front of it lined up with the holes in the core ring, which carried the supporting key. Around the stock supporting ring was placed the retaining wall. This was just a piece of 22-gauge galvanized iron, cut 18 inches wide, and long enough to fit the ring snugly and overlap three inches, being tied with wire. A three-to-one mixture was used which was carefully tamped into place, as suggested by Drawing "i," Plate 8.

This mixture was made just wet enough that it could be squeezed between the hands without oozing water, retaining the shape it was thus forced to take. The time allowed for the cement to set before cutting commenced varied from three to six hours. Simple low flat shapes like bird baths can be turned three hours after the tamping has been completed. A low vase with wide mouth should not be turned in less than four hours after tamping, while a tall pedestal would require six hours to set sufficiently to stand up under the turning process. The amount of head weight due to the shape of the piece being turned affects the above somewhat, as experience will teach.

The turned piece can be removed from the mill when completed, if fifteen hours have elapsed since the tamping of the cement was completed. The pot was removed from the mill thus: First, the supporting key was driven out with a drift pin, inserted in the hole

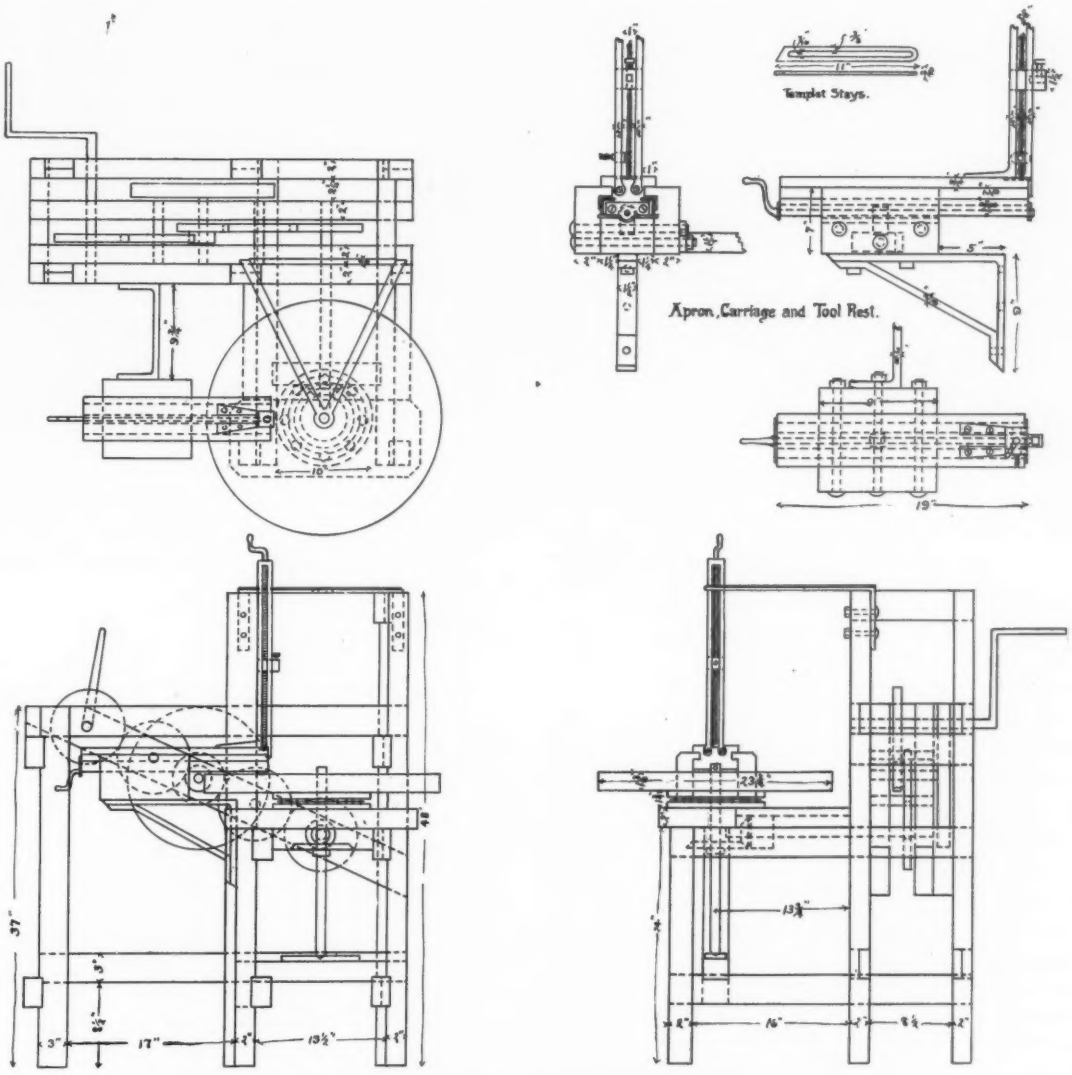


PLATE 9. DETAILS OF CEMENT TURNING MILL.

left in the back of the core ring. Second, the striking rod was given several blows with a mallet, until the core cone dropped down upon the core plate. Third, the top stay brace of the mill was removed, and holding the vase firmly from underneath, the vase was lifted straight up until free of the core cone and striking rod, placing it carefully right side up on an old door mat. The hole in the bottom of the vase was closed with a cork, and the vase filled with water and left standing several days. The water softened the clay so that at the end of this time it was easily removed with a trowel, while at the same time the water absorbed by the cement aided the curing of the piece.

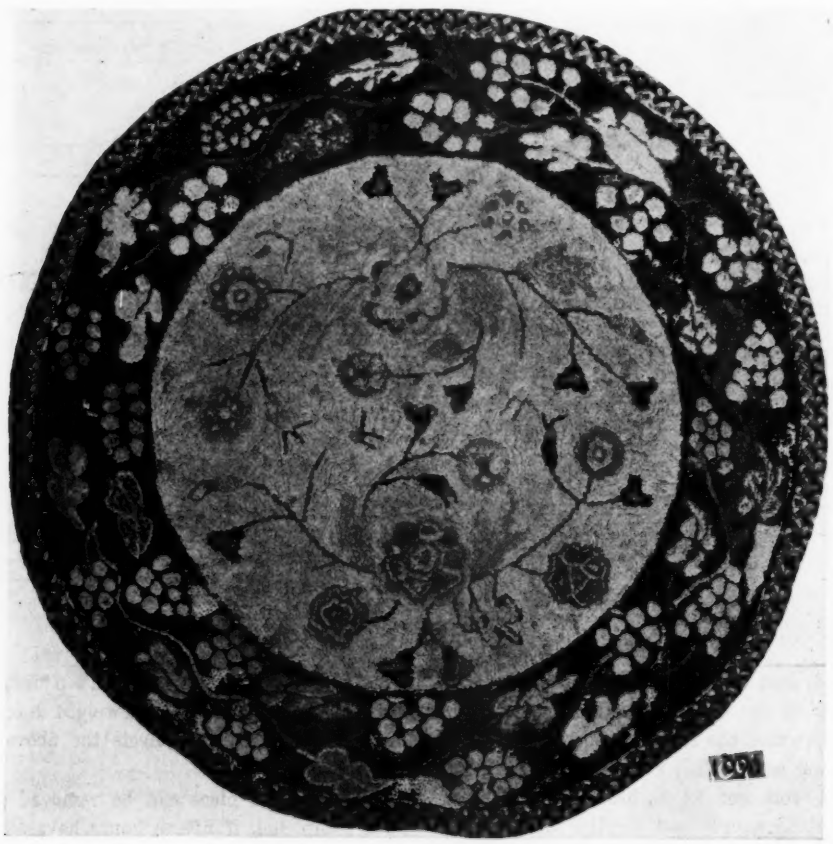
(To be Continued.)

Hooked Rugs and How to Make Them

Jean Paul Slusser

ONE of the few native American traditions in the textile arts is that of the hooked rug, an object beloved of our grandmothers and a fit companion of the patchwork quilt, the rag carpet and the woven spread. Like these, the hooked rug was a product of pioneer life, of the simple needs and simple means of that earlier day when our settler ancestors not only built with their own hands but themselves often furnished the houses in which they and their families lived. Then the long winter evenings were filled with home occupations, and there flourished even in the humblest households that spirit of doing and making which is the true soil in which the industrial arts have always had their roots.

Very recently hooked rugs have been rediscovered. Decorators in our larger cities have collected them from country districts, where for some time they have been unappreciated, owing perhaps to the all-conquering power of the Brussels carpet and machine-made rug with their too often hideous and realistic patterns. They are being sold for unbelievable prices for use in the most fashionable schemes of interior decoration. And while the present craze may be a merely passing one, it is nevertheless true that many of the old country-made rugs of this sort do deserve to be taken quite seriously as art products, and may even occasionally be compared without impropriety with the far more elaborate and finished products of the Orientals.



EARLY AMERICAN HOOKED AND BRAIDED RUG.
A particularly beautiful example dating from the 18th century. The design is admirably spaced for the surfaces it decorates, and the effect of flatness is perfectly maintained.
Diameter of original, 3 feet, 7 inches.
Courtesy of the American Art Association.

ANOTHER EARLY AMERICAN EXAMPLE.
The design is less good than in the circular rug. The loops have not been cut in this rug.
Size 2 feet, 11 inches by 2 feet.
Courtesy of the American Art Association.

Best of all, there is no reason why anyone with two hands, some carpet rags and sufficient interest and inclination to take the trouble should not today make rugs as good as those produced by our grandparents, or as those which are still being made in certain remote parts of the country.

Practice, to be sure, is essential in this as in any other form of craftsmanship, and it is scarcely likely that the novice will turn out at once an article that would meet the severe requirements of a craftsman of the older generation. Time and patience are objects in which none of us seem very rich nowadays.. Yet it is surprising what satisfactory results may be obtained with the investment of even a limited supply of these commodities. The materials to be used are of the simplest—a rectangle of common gunnysacking, not too loosely woven, a few balls of carpet-rags or pieces of cotton or woolen cloth in harmonious colors, and a fair-sized steel crochet hook. The sacking should be cut several inches larger each way than the rug is intended to be, and may be stretched upon a frame of wooden strips tacked together for the purpose, or upon a stretcher such as artists use for their canvases. Most hook rugs are small in size. Two feet by three or less would be large enough for the initial experiment.

If no carpet rags are available, some discarded pieces of cloth or clothing are quite as good or better. These may be cut into strips a half or three-quarters of an inch wide, which need not be sewed together. Even short strips down to six inches in length are available for use. If the colors are not right, the material should be dyed either before or after cutting.

The design, which ought always to be extremely broad and simple, should be drawn upon the stretched canvas in charcoal, and then traced with ink, or it may be laid in lightly in color with oil paints or school crayons. With one hand a strip of the material is now held at the back of the canvas, and with the other a loop of it is drawn by means of the crochet hook through the canvas to the height of about half an inch. A second loop is drawn through at an interval of about a quarter of an inch, and so on. The hooking goes surprisingly fast if the canvas is kept well stretched, and if the operator follows so far as possible the weave of the canvas, in one direction or the other. Loose ends are drawn through to the front and clipped, or they may be left at the back, and the rug later lined or backed. In the old rugs the ends were usually drawn to the front, and all the loops were clipped. When the rug is finished, the edges of the sacking should be neatly turned under and sewed, and if desired a braid or other trimming added as a finish. The close crowding together of the drawn loops in the canvas holds them together, so that if the rug has been well made there is no danger of their pulling out, even under rough usage. Rugs of this type have proven to be most enduring, and many of them are still beautiful and sound after a generation or more of wear.

A simple pattern of conventionalized flowers,

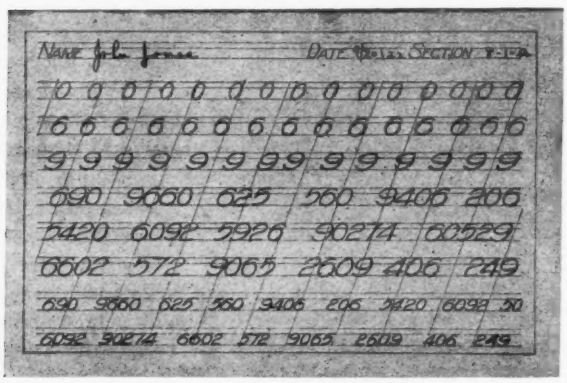
broadly spotted, with some sort of border, will be generally found a satisfactory one. In the old rugs, animals, figures, flags and other intricate motives were often attempted, sometimes successfully, sometimes not. No attempt should be made at realism and the colors may be treated as arbitrarily as desired. The use of outlines for most of the color masses is greatly to be recommended, and it may be said that usually not less than two rows of any one color should be used in a given place. The colors chosen should be few and sufficiently contrasting. In general, it should be borne in mind that quaintness of drawing is no bar to the beauty of the design, and that even the reverse may be true, and furthermore, that slight variations within a given color usually add to the beauty of the color and of the design.

Mechanical Drafting for the First Year High School Classes

John F. Faber, Chairman of Comittee on Mechanical Drafting Course, Erie, Pa.

WITHIN a period of ten years, mechanical drafting has undergone many changes, due principally to the rise of the industrial movement in education. This subject was taught in our schools before shop work was developed, but did not become practical until the manual training movement was well established. The practical problems worked out in our school shops afforded an opportunity whereby the principles of projection could be taught, rather than beginning with geometrical exercises having no immediate practical application.

Erie wished to conform with this change in the arrangement of subject matter and to unify its high school courses in this subject. Accordingly, a committee of the mechanical drafting instructors of the city was appointed by the vocational director to devise a course of study adaptable to high school classes, including trade classes in patternmaking and machine shop practice. Such a course was to be made as practical as the drafting room and school shops would permit. This study resulted in the development of a teachers' manual which was mimeographed and closely followed in all junior high school classes throughout the city. After three years of application and experimentation in the drafting classes, it has proven satisfactory. A brief summary of the first year's work, outlined in this manual, is presented in Chart I and may be beneficial to high school mechanical drafting teachers in arranging their courses of study.



SAMPLE OF LETTERING PRACTICE CARD.

The aims of the course as stated in the manual are:

a. To teach the reading of any simple drawing.
b. To develop the power of visualization.
c. To teach the making of freehand sketches of machine parts.
d. To teach the making of neat, intelligible, instrumental drawings, to scale, to within 1/64 of an inch.
e. To teach the making of tracings and the reproduction of drawings by the blueprinting process.
f. To develop the ability to make neat, legible letters and figures.

Complying with the above aims, the subject was divided into blocks or short units, as follows: Freehand lettering, elementary freehand, orthographic sketching, instrumental drawing, working drawings, tracing and blueprinting. These divisions and the time alloted to each are indicated on Chart I by heavy lines.

Lettering.

The ornamental types of letters, such as block, shaded block and others, are no longer used for practical purposes. Lettering, as taught in this course, is of simple, freehand Gothic style, which can be learned quickly, allowing more time for drawing. To teach this, lettering cards are used. These are 4"x6", printed in light colored ink (preferrably orange) to allow the pencil lettering to be more prominent. A typical lesson, lettered on one of these cards is shown in the accompanying cut.

The alphabet was divided according to the degree of skill required to form each letter or figure. This division, as well as the lettering card, was based upon that of Crawshaw and Phillips, in their textbook "Mechanical Drawing for Secondary Schools". Each figure or letter is practiced separately on a line and the remaining lines are devoted to combinations of the figures and letters taught in that particular lesson with the figures or letters previously taught. Twenty or thirty minutes each week are devoted to lettering. The letters C and P on Chart I, used in connection with the lettering refers to Crawshaw and Phillips.

CHART

No. 1

SHOWING LAYOUT OF WORK TO BE COVERED
-IN-
MECHANICAL DRAFTING
-FOR-
FIRST YEAR HIGH SCHOOL CLASSES

MONTHS	FIRST WEEK	SECOND WEEK	THIRD WEEK	FOURTH WEEK	
SEPT.	LETTERING - 1, 4, 7 ROUTINE - ENROLLMENT - ETC TEACH - PLACEMENT OF VIEWS SKETCHING HOR & VERT LINES	LETTERING - 2, 5 TEACH - PLACEMENT OF VIEWS SKETCHING HOR & VERT. LINES SUGGESTED PROB. - BRICK	LETTERING - 0, 6, 9 TEACH - PLACEMENT OF VIEWS SKETCHING HOR., VERT AND OBLIQUE LINES SUGGESTED PROB. - V-BLOCK	LETTERING - 3, 8 TEACH - PLACEMENT OF VIEWS SKETCHING ARCS & CIRCLES NO INVISIBLE EDGES SUGGESTED PROB. - ROLLER	SKETCHING
OCT.	LETTERING - FRACTIONS AND ARROWHEADS. TEACH - INVISIBLE EDGES SUGGESTED PROB - BUSHING	LETTERING - I, H, L, T DUMMY LESSON TO CLEAR UP HAZY POINTS	LETTERING - F, E, N, Z TEACH - DIMENSIONING DIMENSION SKETCHES ALREADY MADE	LETTERING - X, A, V TEACH - FINISH (MACH. FILE, GRIND) $\sqrt{}$ AND F.A.O PLACE FINISH ON OBJECTS WHERE CALLED FOR BY TEACHER	
NOV.	LETTERING - M, W, Y, K REVIEW OF UNIT	LETTERING EXAMINATION ON FIGURES EXAMINATION ON SKETCHING WRITTEN AND SKETCH FROM ISOMETRIC	LETTERING - O, C, Q, G TEACH - HANDLING OF INSTRUMENTS - STRAIGHT LINE WORK SUGGESTED DWG. - BRICK	LETTERING - D, B, P, R TEACH - HANDLING OF INSTRUMENTS - STRAIGHT LINE WORK SUGGESTED DWG - V-BLOCK	INSTRUMENTAL DRAWING
DEC.	LETTERING - J, U, S TEACH - USE OF COMPASSES SUGGESTED DWG. - FLANGED BUSHING	LETTERING - PAGE 103 - C&P TEACH - ROUNDING CORNERS BOW PENCIL SUGGESTED PROB - CENTERING PLATE	LETTERING - PAGE 117 - C&P TEACH - DRAWING OF TANGENTS SUGGESTED DWG - CONNECTING ROD	LETTERING - PAGE 141 - C&P TEACH - USE OF DIVIDERS SUGGESTED DWG - 5 ARM HANDWHEEL	
JAN.	LETTERING - PAGE 156 - C&P REVIEW USE OF ALL INSTRUMENTS SUGGESTED DWG. - GLAND	LETTERING - PAGE 147 - C&P DUMMY LESSON TO CLEAR UP HAZY POINTS	LETTERING - PAGE 153 C&P REVIEW OF UNIT	EXAMINATION ON LETTERS EXAMINATION ON UNIT WRITTEN AND DRAWING FROM ISOMETRIC	
FEB.	LETTERING - PAGE 154 C&P (INK) TEACH USE OF BROKEN AND FRAGMENTARY VIEWS SUGGESTED DWG - TRACK RAIL	LETTERING - PAGE 165 - C&P (INK) TEACH USE OF AUXILIARY VIEWS SUGGESTED DWG - C.I. BASE WITH TAPERED BOSS	LETTERING - PAGE 174 C&P (INK) TEACH - U.S STD. BOLTS & NUTS SUGGESTED DWG. - PLATE OF BOLTS & NUTS	LETTERING - PAGE 178 C&P (INK) TEACH THREAD CONVENTIONS SUGGESTED DWG - ANY SMALL OBJECT WITH TAPPED HOLES	SKETCHING & WORKING DRAWINGS
MAR.	LETTERING - PAGE 179 C&P (INK) TEACH USE OF DETAIL SECTIONS AND STANDARD CROSS-HATCHINGS SUGGESTED DWG -	LETTERING - PAGE 174 C&P (INK) TEACH - HALF SECTIONS SUGGESTED DWG - FLANGED BUSHING	LETTERING - PAGE 178 C&P (INK) TEACH - QUARTER SECTIONS SUGGESTED DWG - GLAND	LETTERING - PAGE 141 C&P (INK) DUMMY LESSON TO CLEAR UP HAZY POINTS	
APRIL	LETTERING - PAGE 183 C&P (INK) TEACH - SECTIONING ON TWO PLANES	LETTERING - PAGE 185 C&P (INK) TEACH - CONVENTIONAL SECTIONS. SUGGESTED DWG - 5 ARM HANDWHEEL	TEACH - THREADS IN SECTION SUGGESTED DWG - ANY OBJECT THREADED ON OUTSIDE AND HAVING A TAPPED HOLE	TEACH - PART OR BROKEN SECTIONS SUGGESTED DWG - AN OBJECT WHICH COULD BE SHOWN IN SECTION BY BY BREAKING PART OUT	
MAY	TEACH - SECTIONING OF TWO PIECES BOLTED TOGETHER SUGGESTED DWG - FLANGED COUPLING	REVIEW OF UNIT	EXAMINATION ON UNIT WRITTEN AND DRAWING	TEACH - TRACING OF STRAIGHT LINED DRAWING USE DRAWING ALREADY MADE	INKING, TRACING AND BLUEPRINTING
JUNE	TEACH - TRACING OF BROKEN OR DOTTED LINES USE DRAWING ALREADY MADE	TEACH - TRACING CONNECTIONS OF STRAIGHT & CURVED LINES USE DRAWING ALREADY MADE	TRACING & BLUEPRINTING ½ OF CLASS TO TRACE ½ OF CLASS TO BLUEPRINT	TRACING & BLUEPRINTING ½ OF CLASS TO TRACE ½ OF CLASS TO BLUEPRINT	

The alphabet referred to and used throughout this course is composed entirely of capitals, omitting the lower case letters. By continual use of one alphabet until a mastery of it is acquired, much confusion can be avoided and a higher degree of efficiency attained. All the lettering can be made effective, with capitals only, by varying the lengths and widths of the letters according to their importance on a drawing.

Lettering, as indicated on Chart I, extends over a period of thirty weeks.

Elementary Freehand Orthographic Sketching.

Because of the relative importance of elementary freehand orthographic sketching, it was chosen as the first unit for this course. More thought is required in

sketching than in any other part of mechanical drafting. The handling of instruments and the making of neat instrumental drawings is of secondary importance, for this does not necessarily imply that the first fundamental of drafting (selection and proper location of views) has been grasped. By sketching from objects, isometrics, or perspectives, the most important step in the teaching of mechanical drafting can be taken in a minimum of time. If, after each sketch, the instrumental drawing is completely finished, efficient progress is impeded. In correlated trade work, especially with the patternmaking and machine shops, this is a big factor, for it is neccessary to learn the relation of views and the interpretation of simple drawings during the first few weeks of study. It is commonly recognized that shop projects in these departments should be made from blueprints. Therefore, the first problem of the drafting instructor is to teach the students to work intelligently from these blueprints.

The former method of teaching geometric constructions the first few weeks is now, or should be, obsolete. It is of no value to the understanding or reading of a drawing, which is the primary motive for a course in this subject. True, it has its value, but it should be taught only when the necessity for the use of a geometric construction arises. In this way a construction will have a practical application, be retained longer, and supply a definite meaning.

Sketching, as outlined on Chart I, introduces different shaped objects, in order of degree of difficulty involved in teaching.

The line-conventions are introduced in the order outlined on Chart I and the proper weight for each is insisted upon when it is used on the freehand sketches. Section or cross-hatching lines are not introduced until sections are taught under working drawings.

Four hours a week are allowed for drafting in the trade work where this course has been most successfully used. Twenty or thirty minutes are devoted to teaching lettering, leaving sufficient time for the making of several sketches each week.

The advantages of having freehand orthographic sketches for the first unit may be briefly summarized:

a. Economy of time is afforded in developing the most essential point in drafting (ability to select and locate the proper views of an object).

b. A quicker and broader interpretation of drawings is afforded than could be acquired in the alloted time using any other method.

c. Practically the entire alloted time may be devoted to stress technique in handling instruments in the next unit. Most of the line conventions have been taught and a good knowledge of the principles of projection has been acquired.

d. Actual material is provided from which intelligible instrumental drawings may be made, eliminating the possibility of copying drawings from textbooks.

e. The sketches conform with standard commercial drafting room practice.

SUGGESTIVE EXAMINATION.

Part I.

Letter numbers using each figure at least once. Lettering card to be supplied. 15 credits.

Part II.

1. What is the difference between perspective and the blueprint language (orthographic projection)?

2. Illustrate by sketch the relation of views, marking each view plainly.

3. Name five different kinds of lines and properly illustrate each according to its importance on a sketch.

4. Name three stages in sketching and briefly tell what each is.

5. What is meant by finish and how is it placed on a drawing?

6. What is the general rule for placing dimensions on a sketch? How is a fraction line placed on a sketch?

7. Name two kinds of dimensions and illustrate each. 35 credits.

Part III.

Sketch in orthographic projection and properly dimension an object such as is shown in P-10, Chart 2. 50 credits.

Instrumental Drawing.

As its name implies, this unit is devoted to teaching the proper use of instruments in producing neat, intelligible drawings. The drawings may be made from sketches which have been previously made, thus saving time which would be otherwise used in making sketches. Additional sketches can also be made from new problem sheets, samples of which are suggested in Chart 2.

Throughout this unit objects requiring sections are eliminated. Stress is given to proper placing of drawing on paper, correct handling of instruments, proper dimensioning, line conventions, scale drawing and connecting curves. All drawings are checked to within 1/64 of an inch. This is made possible by the use of the pricker dimension-marker in laying off measurements.

The practical side of this teaching can be guided by drawing objects which have been, or will be, made in the school shops. The terms drill, tap, ream, core, finish, bore, measurements in decimals, countersink, counterbore, keys, keyways, and various fits can be used advantageously. This makes the best kind of correlation between the drafting room and shops.

The practice of shading drawings is prohibited, not being common trade practice.

SUGGESTIVE EXAMINATION.

Part I.

Letter words on supplied card. Exercise may be chosen from text. 15 credits.

Part II.

1. Which is better as a working drawing for a mechanic—a freehand sketch or an instrumental drawing? Why?

2. Tell how to square drawing paper on the board?

3. Why use the pricker dimension marker in preference to the pencil in laying off measurements?

4. What is the method used in rounding an angle of 90° with a given radius? Show by sketch.

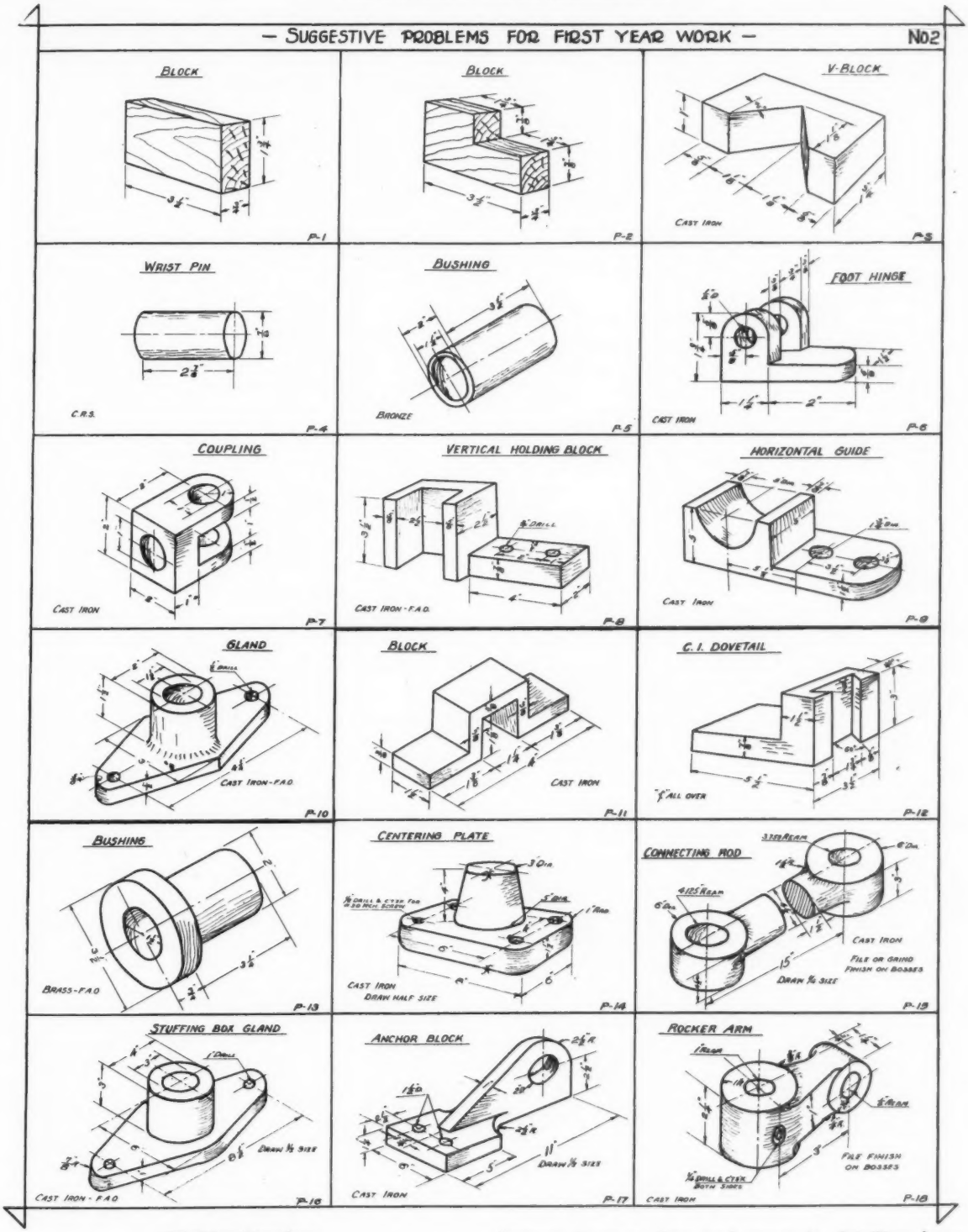
5. What is meant by making a drawing to scale?

6. What determines the scale of a drawing?

7. When drawing to scale, should the dimensions of the drawing or the dimensions of the object be placed on the finished drawing? Why? 35 credits.

Part III.

Make an instrumental drawing in orthographic projection of an object such as is shown in P-17, Chart 2. 50 credits.

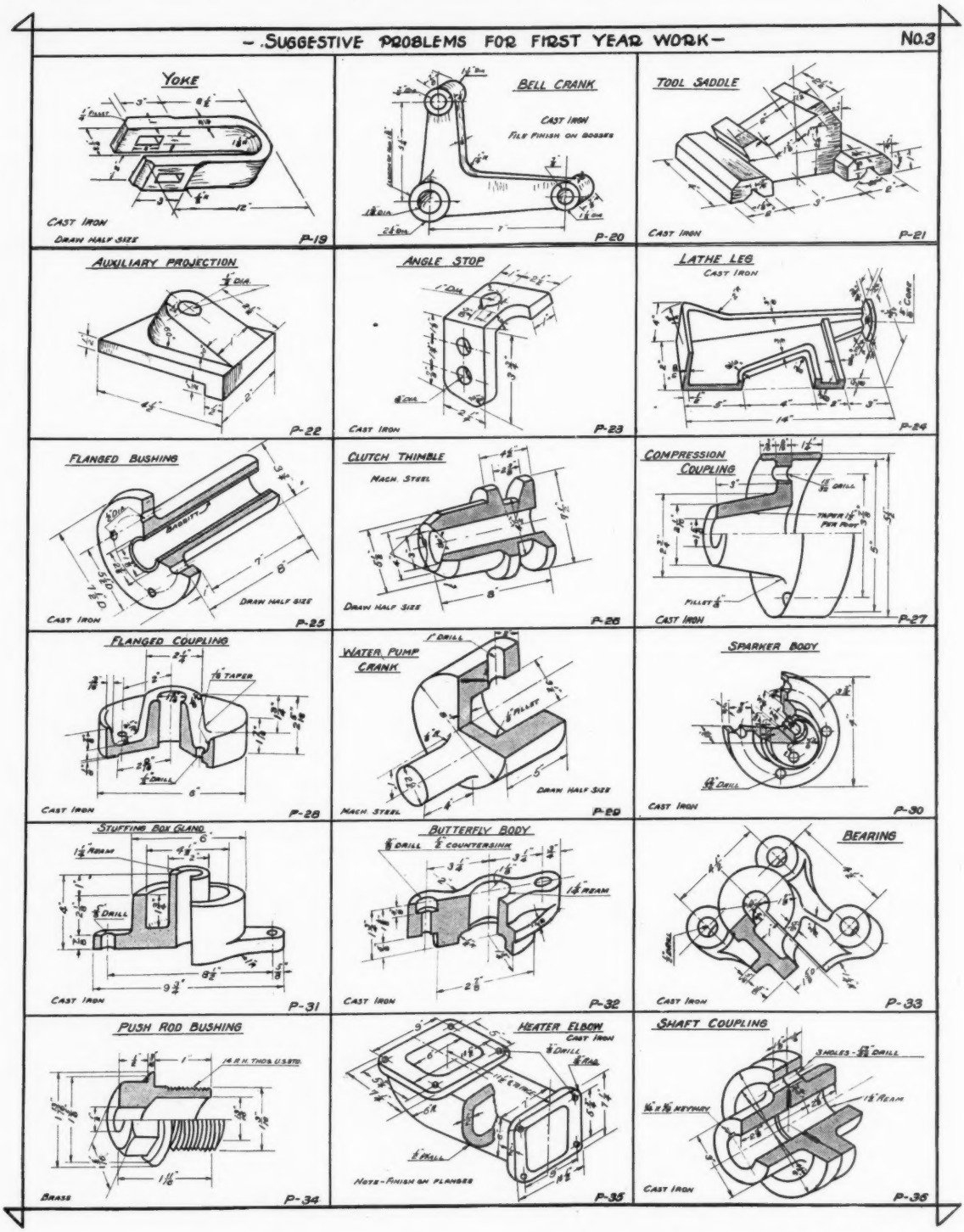


Working Drawings.

This unit is devoted to broken views, auxiliary projections, fragmentary views, thread conventions and sectioning.

The break conventions stressed are the square and circular. Because of its common use in industry, the auxiliary view, or true projection of a slanting surface, is important. The fragmentary view is given a place, because it saves time and space in detailing large symmetrical parts. The U. S. Standard Bolts and Nuts, as well as thread conventions, are taught quickly in one plate. And the various phases of sectioning are arranged according to the ability of comprehension.

The suggested problems for sectioning shown on Chart 3 are not cross-hatched to show the material of which the object is made. The cut surfaces are shaded



with pencil. This gives the student no aid as to the correct cross-hatching to use on his instrumental drawing.

SUGGESTIVE EXAMINATION.

1. What is a broken view and how does it differ from a fragmentary view?

2. How is the true shape of a boss shown on a drawing when no regular view exactly shows it?

3. What is meant by ½-13 U. S. Std. Thread? Why specify the U. S. Std. thread in preference to other threads when possible to do so?

4. Why is a sectional view used in drawing?

5. What is a conventional section? Name a case where one would be used.

6. How is a tapped hole shown in section? Show by sketch.

7. How would you section two pieces of metal, bolted together, so as to show they are not one solid piece?

8. Indicate by sketch the standard cross-hatchings for cast iron, steel, brass and babbitt.

9. How far apart should section lines be drawn as a general rule? How are they measured?

10. What is meant by a half section? A quarter section? Illustrate each.

Tracing and Blueprinting.

It is a common practice in some high schools, to ink pencil drawings from the beginning of the year. This has the disadvantages of being poor trade practice, requires valuable time which could be used more profitably on detail pencil drawing and ruins many of the students' drawings. In the course of study under consideration *no drawings* are *inked* and no tracings are made during the first year, until the last five weeks school is in session.

The use of colored inks is prohibited, because it is not a common trade practice.

To avoid unnecessary expense, all tracings are made on tracing paper. Tracing cloth is used when the drawing is of importance and to be filed as property of the school district.

It is well to have standard size drawings and trace several on one tracing, thus saving tracing cloth and blueprint paper as well as facilitating blueprinting.

During the last two weeks of this unit the class is usually divided into groups, working alternately in the blueprint and drafting rooms, affording each the opportunity to trace and blueprint.

Suggestive Problem Charts.

Charts 2 and 3 made of suggestive problems are selected from many such problem sheets used in the Erie schools. Many were redrawn from various textbooks on mechanical drawing, redimensioned and arranged to conform with the different units.

The arrangement of these problems is based chiefly upon Chart 1, as follows:

P-1 through P-10 .....Sketching
P-11 through P-21 ..... Instrumental Drawing
P-22 through P-36 ..... Working Drawings

The selection and arrangement of problems is largely a matter of the teacher's experience, amount of available material, aim or purpose of the course and the individuality of the class. It has been found that certain classes grasp the point being developed from one object or problem sheet, while others grasp it more readily from a different object or problem sheet.

These problems shown on Charts 2 and 3 and their arrangement are merely suggestive of the manner in which problems might be arranged to conform with the course of study outlined on Chart 1.

Individual Differences.

To meet the individual aptitudes of different students pursuing this course of study, a series of isometric or perspective problem sheets (4″x6″) has been arranged for each unit. When one assignment is completed quicker by some than others, another problem sheet is chosen from the same series, thus keeping the entire class in the same series or group of problems.

Use of Models.

It is difficult, at times, for the student to choose and arrange the necessary views of an object from an isometric problem sheet. It is, therefore, necessary in such cases to resort to the use of objects until an idea of orthographic projection is acquired.

Each high school drafting room in Erie is supplied with a set of small patterns, different shaped wooden blocks, broken machine parts and small rough castings.

A Viewpoint.

One of the chief criticisms a course of study like the present may receive is, "Too rigid, no allowance made for a change in the regular school routine".

The loss of one period interferes with the work according to Chart 1 but is it not better to attempt to reach some goal than be satisfied to cover what you might? One executive states, "Plan your work and work your plan". This might better be stated—Plan your work and as far as human effort allows, work your plan.

WHAT DETERMINES GRADES IN MANUAL TRAINING AND MECHANICAL DRAWING?

Mr. A. R. Nichols, editor of the Industrial Arts Section of the Oregon Vocational Teachers' Exchange suggests the following method of determining grades in manual training and mechanical drawing.

A (95-100) is the reward for extra fine work, showing originality or ability to do one's own thinking and ambition to do more than the course requires.

B (90-95) is given when a student shows conscientious effort in the work; who is teachable and has a fair degree of skill.

C (80-90) is given to the student who does just enough to "get by". Is easily discouraged and often tries to start new work before finishing the project he originally started.

D (70-80) is for the student who needs constant attention, is slow about getting to work. Would rather loaf and talk than improve his time. "D" students are likely to become failures unless they watch their step.

F (below 75) means that the student has failed in his work on account of his lack of interest, improper deportment, and laziness. Good conduct, obedience, industry and the proper spirit only can bring him to success.

What Determines a Grade in Mechanical Drawing?

A (95-100) is the reward for extra fine work, showing originality or ability to do one's own thinking, and ambition to do more than the course requires.

B (90-95) is given when the drawings are correct, well-placed, and stand out clear; that is, they follow the standard lines and conventions, and the lettering looks neat and regular.

C (80-90) is given to the average student who keeps up to the schedule, but is not willing to make his work look neat and accurate.

D (75-80) is given to the student who needs constant attention and pushing; who is slow in getting started. He hands in work that is not complete; he does not care how his work looks, so long as he passes.

F (below 75) means that the student has failed in his work, seldom from the lack of ability, but rather from the lack of interest and from laziness. He often draws with the stub of a dull lead pencil, and his instruments are caked with dirt and are rusty. He may have disturbed the class by talking, borrowing, and leaving his place. Good conduct, study and obedience to the rules of the drafting room will lead him to success.

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN

Editors

EDITORIAL

BACK TO FUNDAMENTALS.

New Year's resolutions need not be new resolutions. They may well be renewed decisions to do the things we have tried to do with little success. We get the cue for New Year resolutions from our failures rather than our successes.

Art instruction has been carried on in the public schools for more than one generation yet fundamentals of art are not generally understood or acquired by our pupils. Some progress has been made in the design of our manual art work during the past few years.

The clearest evidence of this progress is the simplicity of design in school work. We have discarded the invention and use of yards of ornamental stuff. We have stopped attempting to copy the great masters and have begun to interpret them for our own enjoyment and education.

We have learned to distinguish between art and ornamentation.

Our houses, our garments, our utensils and our merchandise in general have become plainer and more serviceable than ever before and we are convinced that they look the better for it. There is little danger of making them too plain. The danger lies in making them inappropriate. We have learned that things may be severely plain and yet be beautiful in proportion, tone, color and the expression of use.

It requires artistic judgment to select and use appropriate things. One designer will provide a suitable design for the use of many people who must be taught to select and use appropriately.

We have put an emphasis on creative ability and originality that even our teachers of art cannot aspire to and which has discouraged many pupils from developing a fair ability to choose and use consistently. We recall hearing many years ago a reference to the bee as transforming the sweet nectar of the flower into honey by the mysterious process of adding to it a bit of acid from its own body. This illustration was used as significant of the subtle and mysterious transformation of a common substance into a work of art. Now we know that the bee made a new kind of useful thing by a chemical process that was instinctive rather than ingenious.

We give the bee credit for industry but we know it was not an artist or even an intelligent chemist.

The artist and the chemist must work intelligently and with understanding of cause and effect or they cannot work at all.

Let us resolve to teach the fundamentals of design as a process of reasoning from cause to effect.

INTERPRETING DESIGN.

The designer of a good utensil composes his design with a clear understanding of the way it is to be used and the result of using it in that way. There is absolute propriety in a good design. It "looks the part" and shows clearly what it is designed for. This appearance is an important expression in art and the understanding of it is important in art appreciation.

With this idea of the expression of purpose clearly in mind, the art teacher will find in any community where nature and man have developed, an abundance of illustrations for art instruction.

Our industrial art instruction should in large part be devoted to leading our pupils to interpreting the expression of industrial art. No better study can be given to a class in design than to find out why every part of a successful design is devised and placed as it is.

BETTER HOMES.

We have just witnessed a laudable attempt to give impetus to the movement for better homes by designating a "Better Home Week".

It is difficult to do much in the way of improving a home where the proper home spirit does not exist and where no great *Home Ideals* have been set up. There is much that can be done, however, in the physical improvement of many homes. Insanitary conditions can be removed. Better furnishings can often be installed. Proper arrangement often adds both convenience and beauty.

Of course, one of the chief concerns of the present movement is to encourage home owning. Once a home is owned, the sense of proprietorship, the pride in improvements, and the feeling of security contribute immeasurably to one's value as a citizen.

In the main, whatever is done for the betterment of homes will be done by the schools through the younger generation. The teachers of home economics, art, industrial arts, and kindred subjects will be largely responsible for any improvements that come to the homes. It is an opportunity which such teachers should covet.

Not all of the necessary influence, however, can be expected in the class room. Teachers will find it both necessary and desirable to work through women's organizations, civic clubs, and any other agencies through which the progressive people of a community work.

The home of today is in a death grapple with disintegrating influences of every sort. It is in competition with certain social customs and evils. It is struggling with various forms of commercialized amusement, entertainment, and recreation. The home needs to be made more attractive. It needs to be made more comfortable and satisfying. It needs to be relieved of much of the drudgery. All members of the family need to be taught to share the home responsibilities with mother.

No other one thing is more important than the matter of home improvement and any teacher should be happy to participate in this great movement.

THE SPIRIT OF THE TEACHER.

The student attitude is very largely a reflection of the teacher attitude. If the students are a noisy, irresponsible, reckless lot, the strong probability is that the teacher, even though he is not of that disposition himself, has failed to grip the students with his influence. A turbulent, troublesome student body is rather conclusive evidence of an easy-going, indifferent control or of the harsh regime of a task-master.

It follows, therefore, that the complaining teacher who is constantly finding fault with his students in general, is unwittingly building up a case against himself. A great teacher was fond of saying, "I like to stand outside the classroom door and hear the students' comments as they leave the recitation. These are the index to the teacher's teaching ability and his actual influence upon the students."

A real teacher is an *influencer*. He is leader, guide, and co-worker all in one. No real teacher, therefore, can work by the clock. His must be a joyous participation in the growing, expanding lives of his students. The drudgery of teaching will not *seem* drudgery to the real teacher. A buoyant, happy, optimistic, enthusiastic teacher is worth *any price*, even if he never gets it.

THE MISUSE OF THE TERM, "VOCATIONAL EDUCATION."

After all these years of discussion concerning the proper terminology for the field of vocational education, industrial education, industrial arts, manual training, etc., it is the most common thing to find the terminology wholly confused and frightfully misused.

It is not unusual to find the simplest forms of handwork in the primary grades referred to by school people as "vocational work". The best authorities, including the United States Government, have defined vocational education as "preparation for profitable employment". Certainly, under such a definition it would be a difficult stretch of the imagination to classify paper cutting and clay modeling as "vocational work".

Every cross-roads manual training shop is turning out "vocational work", according to inspired reports. It should be said in justice to such shops that their work is just about as "vocational" as the work of many of the large, well-equipped and pretentious high schools. This is not condemning the work which is being done in either type of school. Such work may be the best possible type of work to meet the needs of the communities which these schools serve.

This is simply saying that the work is not "designed to prepare for profitable employment", and hence is not vocational. There is precious little genuine vocational work going on in the high schools of this country, but lots of it is being called "vocational".

The fact is that a lot of teachers became alarmed at the prominence given vocational education and widespread demand for it; they became ashamed of the old terms "manual training", "manual arts", "industrial arts", etc., and took cover under the new and popular name of vocational education. The character of their work, however, did not materially change.

Let it be said again that the general industrial arts work commonly found in good high schools is better adapted to the needs of the average high school boy than specific vocational courses. *There is, of course, a place for the specific vocational courses in high school where boys have already selected their trades and are ambitious to begin their preparation.* The vast majority of high school boys, however, have not selected trades and are not headed toward the life of a tradesman.

It is high time that teachers realize the fundamental purpose of their work; that the work be adapted to the specific needs of the pupils involved; and that the proper terminology be used to designate the work in a given case.

FOR COMPENSATION.

There is a good deal of humbuggery going on under the guise of "psycho-analysis", "business analysis", etc., and even some "vocational guidance experts" are fakers.

We have the greatest faith in a sane, intelligent scheme of vocational guidance such as is proposed by the sponsors of the National Vocational Guidance Association. But all sorts of "expert advice" is being handed out "for compensation" by college professors who have never had any contact with real jobs either in business or industry, and whose names would not be recognized anywhere among those who have really developed the important work of guidance and advisement.

It is a sad fact that any science, discovery, or new field of human endeavor, has always been exploited by the interloper and the faker who are always willing to offer their services "for compensation."

Household Mechanics. In order to enrich the manual training course of study at Corvallis, Ore., the instructors have been trying to make all the contacts possible with industry. In the Corvallis schools such contacts were made through the course called household mechanics. This course can also be made a definite "tryout" course as it brings in many of our trade occupations.

The purpose of the course is to give the boy a knowledge of the use and care of the different objects about the house, such as doorbells, electric switches, electric irons, etc.

The course consists of the following:

1. Sharpening tools. Study of the methods and practices in sharpening bevel and wedge-edge tools, saws and lawn mowers.
2. Soldering. A study of the principles of soldering, and practice in the use of the soldering iron in the making of some minor details.
3. Nails and Screws. A study of the correct use of nails and screws applied on some special problems under construction.
4. Locks. A study of different kinds of locks and their mechanism, with practice in the setting of locks.
5. Hinges. A study of the sizes and kinds of hinges, and practice in setting hinges.
6. The range boiler. Circulation of warm water, illustrated by experiments. Connections and methods of heating.
7. Faucets. Types of faucets. Specifications and repairs.
8. Traps. Kinds and purposes of traps. Ventilating, with actual practice in cleaning.
9. Electric bells. Electric doorbell construction, current supplied by cells or transformers. Bell wiring problems.
10. House wiring. Principal parts of house wiring system. Testing and replacing of fuses.

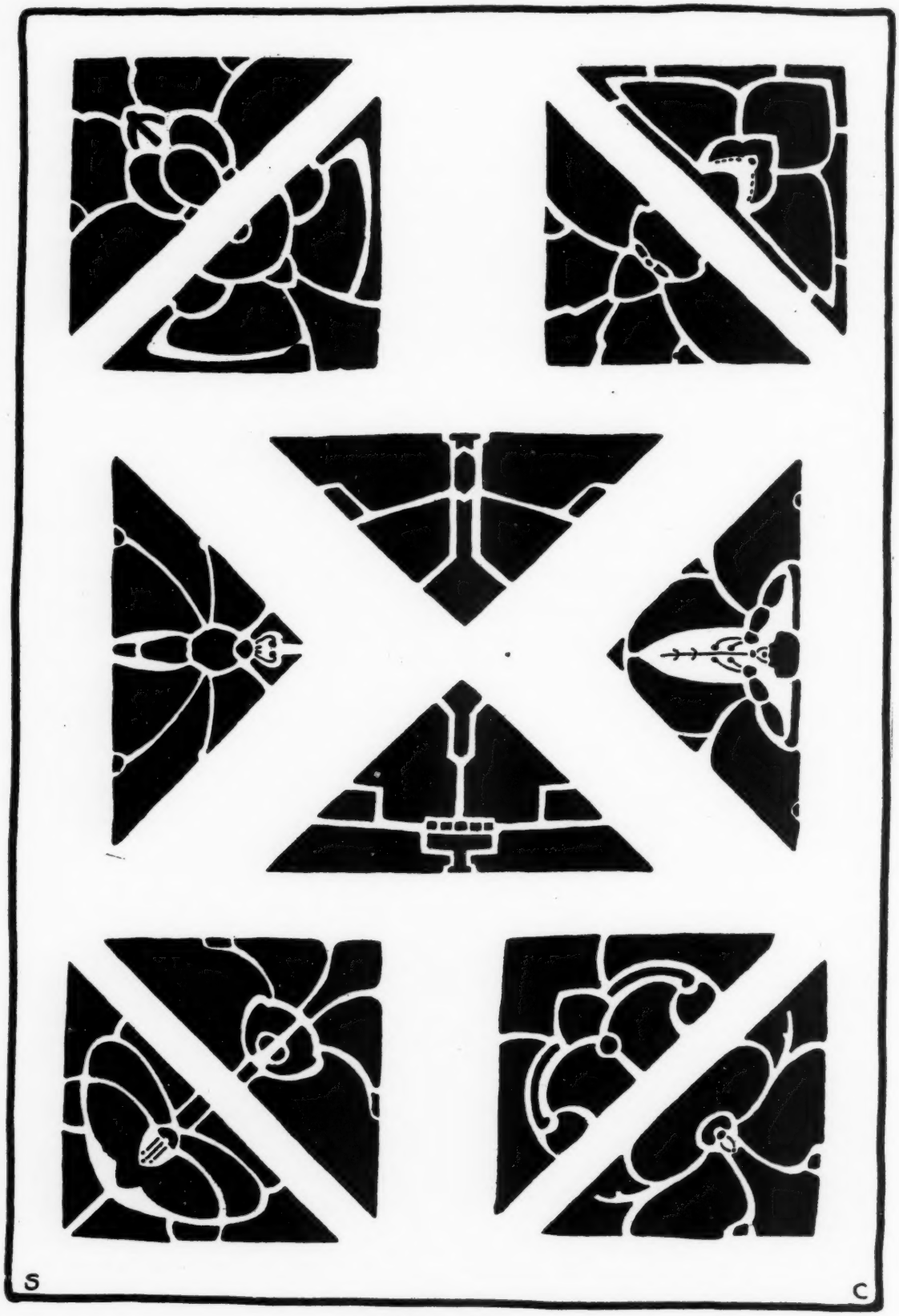


PLATE XI

THIS IS THE ELEVENTH OF A SERIES OF PLATES BY MISS SARAH COHOON, SPRINGFIELD, MASS.

Radio Receiving Set

F. C. Hughes, Spokane, Wash.

THE two radio sets shown and described in this article are the results of several months spent on the part of the author in searching everywhere and working in his own shop to find a model that might be made up in the ordinary manual training shop without additional tools and equipment—one that would fit the ability of the smaller boys. In these models the manual training teacher will find material that he can make use of even in the fifth grades. The author has seen some very satisfactory models turned out by boys in the fifth grade.

By making use of old dry cell terminals and making up the switch knob in the class instead of buying them, the cost of either of these sets may be brought down to less than 50 cents, actual cost.

In either one of these sets, if made as directed and on right principles, good results should be obtained on shorter wave lengths.

While the details of construction for these sets are found in the accompanying drawings, the following descriptions may help also.

Set No. 1.

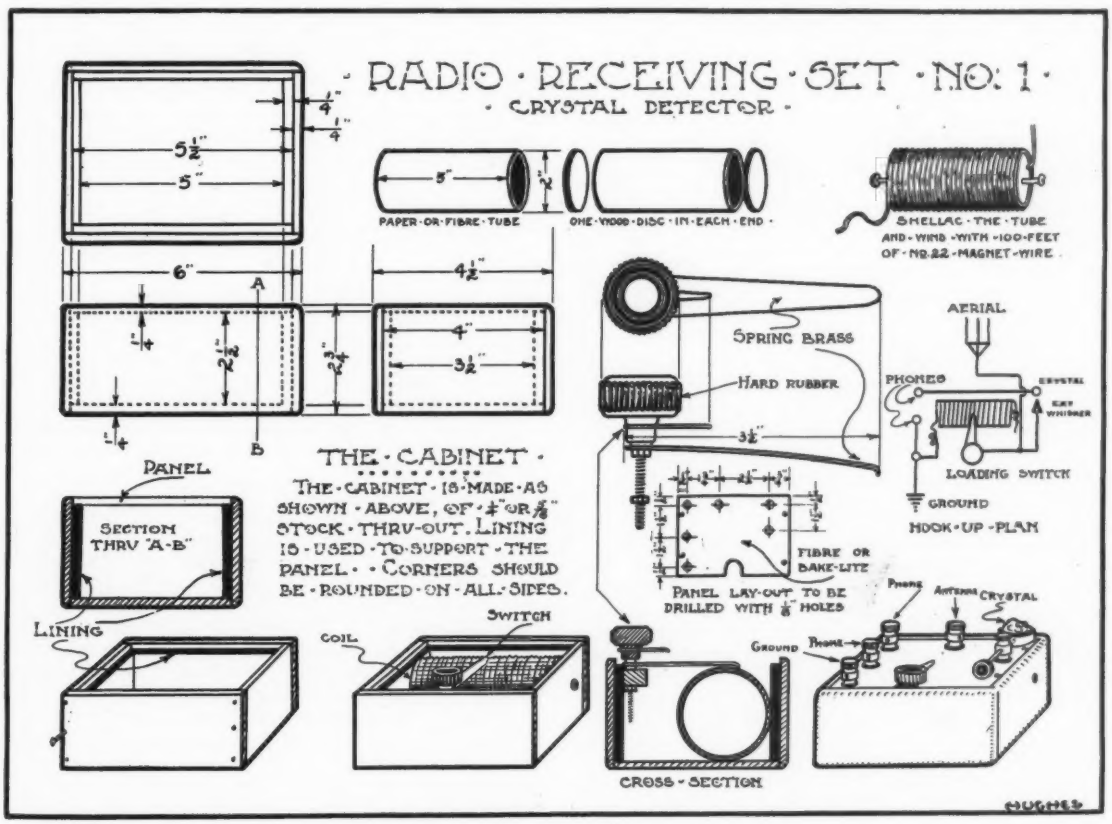
Cabinet: The cabinet may be made of any light wood of about one-fourth inch thickness and may be made any size to fit the conditions such as size of the tube, switch or material. If some good soft wood such as mahogany or gum is used and the corners are rounded and nicely finished, a very handsome piece of work may be turned out. It is suggested that the outside of the case or cabinet be finished with oil or shellac and varnished and rubbed down.

Panel: The panels on all the commercial models, or most of them, are made of fibre or bakelite; however this is not absolutely necessary. Thin wood may be used with equally good results on a small crystal set such as this one. The leakage through the wood will be found to be very slight. (On some of the larger and more sensitive models this might be an objection.) The thin wood may be painted black and is almost the same in appearance as the bakelite.

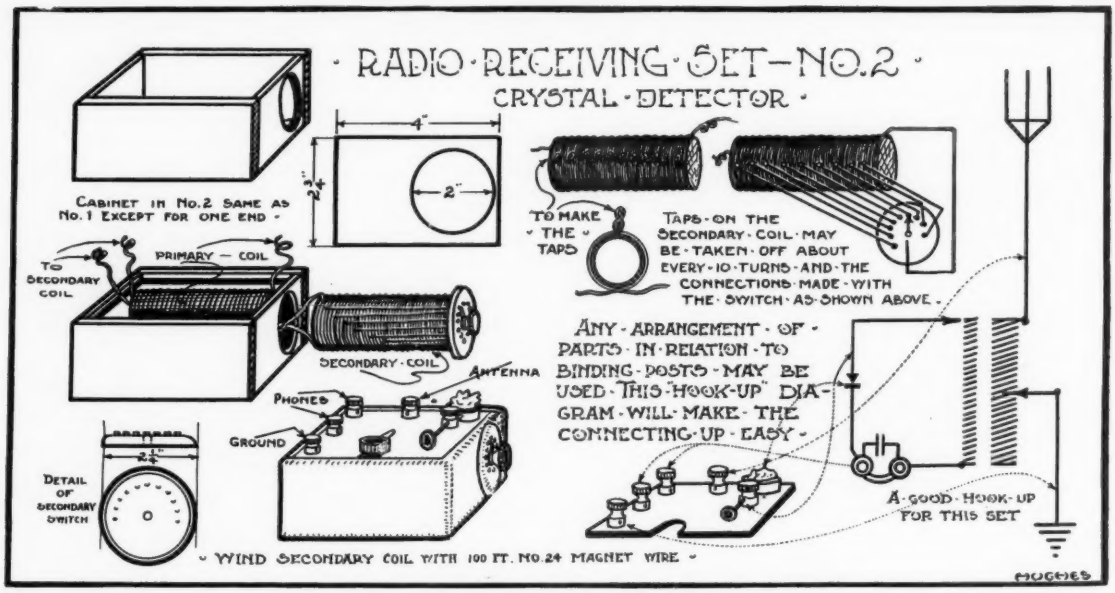
Coil: The coil may be wound on a tube as shown in the drawing, or it may be wound on a cylinder of wood. If the larger boy has a turning lathe at hand a very good core may be made in the form of a spool. If a tube is used, a paper mailing tube is good, or a round food or cereal container might be used. In the case of using the latter, the size of the cabinet can be adjusted to fit it.

The core should be first given about two good coats of shellac, before the wire is wound. Either the cotton covered or the enameled magnet wire may be used, but in the case of this coil, where there is a slide the enameled wire is to be preferred, as in the case of the cotton covering there is a tendency to ravel. After the wire is wound carefully, the whole should be given at least one coat of shellac, and the ends secured so that they will not loosen. One end is to be "pig-tailed" and the other is to be disposed of as shown in the drawing.

The coil may be held in the cabinet by two screws in the ends as shown.


RADIO · RECEIVING · SET · NO. 1 ·
· CRYSTAL DETECTOR ·
PAPER · OR · FIBRE · TUBE
ONE · WOOD · DISC · IN · EACH · END ·
SHELLAC · THE · TUBE AND · WIND · WITH · 100 · FEET OF · NO. 22 · MAGNET · WIRE ·
SPRING BRASS
HARD RUBBER
AERIAL
PHONES
CRYSTAL
CAT WHISKER
LOADING SWITCH
GROUND
HOOK · UP · PLAN
THE · CABINET ·
THE · CABINET · IS · MADE · AS SHOWN · ABOVE, OF · ¼" OR ⅜" STOCK · THRU · OUT. LINING IS · USED · TO · SUPPORT · THE PANEL. · CORNERS SHOULD BE · ROUNDED · ON · ALL · SIDES.
PANEL
SECTION THRU "A-B"
LINING
SWITCH
COIL
FIBRE OR BAKE-LITE
PANEL LAY-OUT TO BE DRILLED WITH ⅛" HOLES
GROUND
PHONE
ANTENNA
CRYSTAL
CROSS · SECTION
HUGHES

DETAILS OF CRYSTAL DETECTOR RECEIVING SET.


RADIO RECEIVING SET—NO. 2
CRYSTAL DETECTOR
CABINET IN NO. 2 SAME AS NO. 1 EXCEPT FOR ONE END
4"
2"
2¾"
TO MAKE THE TAPS
TAPS ON THE SECONDARY COIL MAY BE TAKEN OFF ABOUT EVERY 10 TURNS AND THE CONNECTIONS MADE WITH THE SWITCH AS SHOWN ABOVE.
PRIMARY — COIL
TO SECONDARY COIL
SECONDARY COIL
ANTENNA
PHONES
GROUND
ANY ARRANGEMENT OF PARTS IN RELATION TO BINDING POSTS MAY BE USED. THIS "HOOK-UP" DIAGRAM WILL MAKE THE CONNECTING UP EASY.
DETAIL OF SECONDARY SWITCH
A GOOD HOOK-UP FOR THIS SET
WIND SECONDARY COIL WITH 100 FT. NO. 24 MAGNET WIRE
HUGHES

DETAILS OF A CRYSTAL DETECTOR RADIO RECEIVING SET.

Switch: The switch may be any commercial switch, with a long arm, cut from spring brass and inserted as shown in the drawing, or this switch may be made from a spool as is also shown in the drawing. This switch arm is so placed in the cabinet as to describe an arc across the length of the coil. The insulation should be taken off where the arm comes in contact with the coil.

Detector: The detector may be any means or device for adjusting and maintaining a good contact between the "cat-whisker" and the crystal. Many of these devices are shown in the different radio magazines so that its construction is not shown here.

A fixed condenser may be used in this set if desired;—in which case it may be either placed inside the case or mounted on the outside between the phone terminals.

Set No. 2.

In the second set shown in the drawing the idea of the loose coupler is made use of. This has a little advantage over Set No. 1 in that one can tune a little more sharply. Set No. 2 is exactly the same as Set No. 1 in every general detail except for the sliding coil which is fully shown in the drawing. The addition of this loose coil, of course, will necessarily change the "hook up" plan, of Set. No. 1.

PRINTING IN THE MECHANIC ARTS DEPARTMENT, WEST HIGH SCHOOL, SALT LAKE CITY, UTAH.

G. A. Raeth, Head of the Mechanic Arts Department.

Printing is now in its second year in the high school at Salt Lake City and during that period has won considerable attention because of its success and the kinds of work being done.

Like most of the industrial subjects taught in the mechanic arts department, provision is made for those who are taking printing for the first time and for those who wish to specialize in this branch. Thus, for the first group, Course A, twenty weeks is given and for the second group, Course B, forty weeks is specified. It has been stated that the twenty weeks' intensive training that the boys obtain in this shop is equal to two years of apprenticeship in the printing shops on the outside, and many have been the opportunities to demonstrate this fact.

There are standards of production. Each phase of the practical work done by the students is equal to or better than that of some of the commercial shops. School officials have testified that the jobs turned out by the students of printing compares favorably with most of the work done for the Board of Education in the local job plants in previous years. The work is of high quality.

The principles of order, neatness, accuracy, workmanship, promptness, etc., are given first consideration and the students are impressed with their importance throughout the course. Simple lessons in straight matter are mastered before more difficult composition work is attempted.

Feeding is begun by practicing with the aid of plain cards and envelopes. No printing is done on these. The common types of cases are learned and type is distributed. Cards are printed with the student's name, address, etc. Later short sayings and Christmas cards are printed and a little color and border work are done. Quality is especially emphasized at all times thus assuring an appreciation of good printing.

All printing needed by the board of education that can possibly be handled with the equipment on hand is done by the classes in printing. Booklets and work that calls for much typesetting and which would tie up large quantities of type for a long period is linotyped or monotyped and then handled by the students. Cuts and forms are made of such jobs that have to be printed from time to time or from year to year. In this manner much routine work is avoided. Every care is also used in not putting students on jobs in advance of their instruction knowledge even though working on commercial or production jobs.

Last year the East and West High Schools decided to have separate annuals. The annual for the West High School was printed by its print shop in the technical building. The fine work done on this annual by the students has received much comment. As the printing was introduced for the first time last year it was necessary to have students of the first semester continue their work the second semester in order to assure the success of the publication, for there were no advanced students except those who had enrolled the first semester.

Careful check is kept on work done in the shop. Printing orders are handled through the supervisor's office. Job tickets in the form of an envelope upon which all information is printed, are used in handling all jobs. Further check is kept on all work done by the students on work record sheets. A foreman assists in checking all

work done by the students and lends any other assistance desired by the instructor.

All jobs when completed are recorded and samples are placed in a file. Forms also are numbered and filed away. No finished work is released until signed for by the customer on a special form of delivery slip which has been printed especially for the print shop.

A careful check is also kept on all supplies used and on hand. A special requisition form is used in ordering supplies. Every opportunity is taken to handle every phase of the print shop in a businesslike and scientific manner.

The Pied Pica Club, made up of students of the printing classes, lends additional enthusiasm to an already well organized department. The students are looking forward to a bigger and better annual than the one published last spring. It has many new features not previously attempted in any other school annual, according to the instructor and students.

Other features of the print shop classes are trips to local plants; practical talks and lectures on printing and on composition and manufacture of printing materials; safety-first rules, hygiene and their application; applied mathematics, applied science; the use of good English; color work; the use of good reference books, specimens of good work, drawings, pictures, materials, catalogs; design; book binding; the use of different kinds of paper. Reviews and examinations of the work are held every month.

Equipment for the Christmas Railroad

H. D. Parker.

This project is intended to supply post-Christmas work for the multitude of boys who received electric or mechanical trains on the 25th of December. By building realistic and substantial equipment for their systems they maintain interest in an expensive gift for a period long enough to insure their receiving the maximum of educational value and incidentally several instructive problems in woodworking.

As shown in the photograph, the equipment made of wood consists of the following pieces: Station, freight platform and signal, double semaphore, water tower, locomotive crane, bridge, combined tunnel and overpass, and battery box (or transformer container). Separate sketches give the dimensions of each piece and the construction details follow.

Fig. 1 gives the dimensions of the station. This is constructed of ½" pine on a base of the same material. The doorways and windows are cut out before assembling the walls. The doors are hung with miniature hinges supplied by good hardware stores or model houses. The roof is hinged at the back, the chimney serving as a handle for opening to permit using the interior. The main roof, porch roof, and sign board are ¼" material. The porch posts are ¼" square. After assembling the station walls, the porch floor and posts were given two coats of gloss white oil paint. The roofs and chimney were painted bright red enamel. The brickwork and structural details were lined in with black enamel. Doors are green and the signboard has the name in black on a yellow ground. A brass hook and catch serve to fasten the roof in position when desired.

The construction of the freight platform is clearly shown in Fig. 2. It is made of ½" pine for the floor and incline. The signal arm is of pine, slotted at the top for the ⅛" signal arm. Soft 10-gage brass or iron were bent through holes drilled in the arm and a control rod permits its operation. This platform was painted light red, signal mast white, signal arm red and control rod black.

Fig. 3 shows the double semaphore whose construction is along the same lines as the one on the freight platform. The base is enameled green, the mast white, the upper arm is red with a white band and the lower yellow with a black band.

The water tower tank is a solid piece of white wood turned to the dimensions given in Fig. 4. It is doweled to the round post supporting it, which in turn is fastened to the base by a long screw. The ladder consists of two strips of ¼" by ⅜" oak and its rungs are wire nails cut off and pressed through slightly smaller holes drilled in the sides. The best way to insert these rungs is by press-

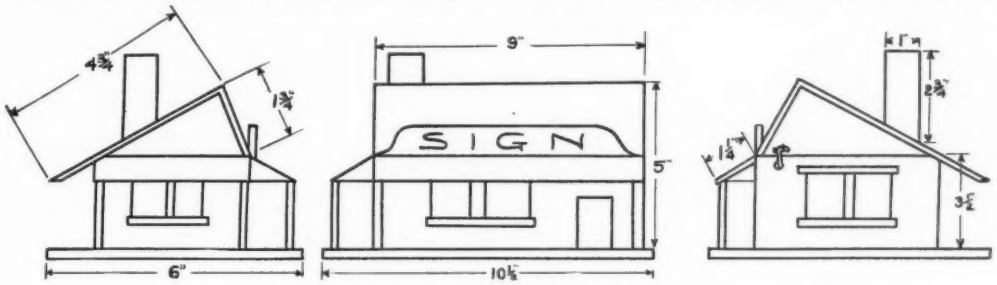


FIG. 1. THE RAILROAD STATION.

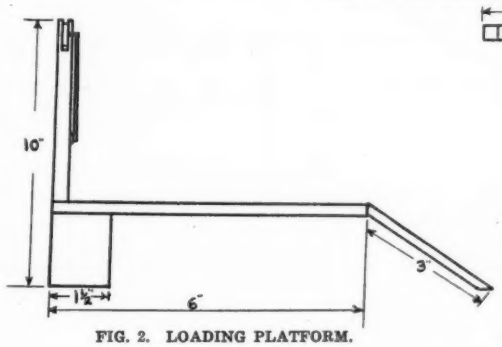


FIG. 2. LOADING PLATFORM.

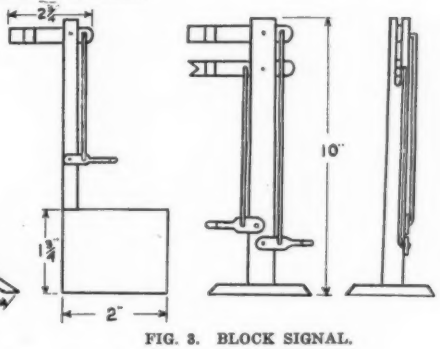


FIG. 3. BLOCK SIGNAL.

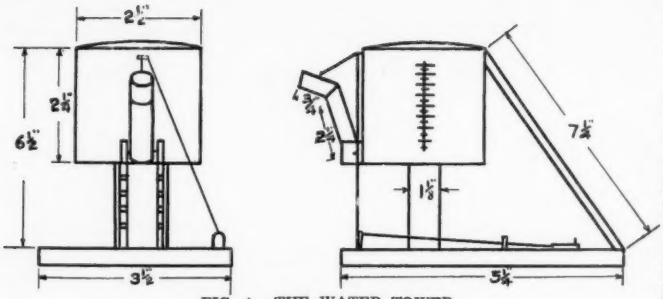


FIG. 4. THE WATER TOWER.

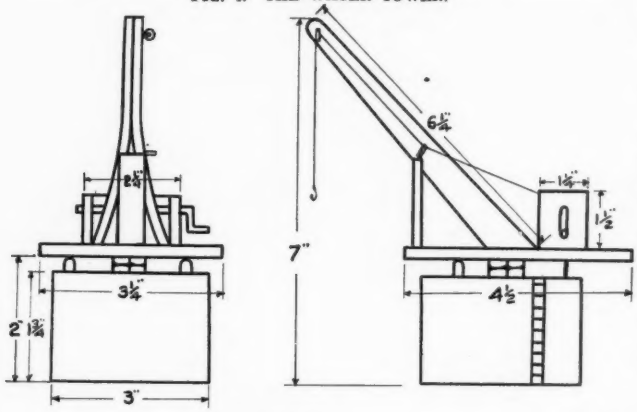


FIG. 5. CRANE.

ing them in place in a vise. For the water spout a ½" round pine rod is cut as shown. The spout hinge consists of two small ⅛" pieces and the hinge itself is a long brad. The spout should work freely by means of the cord shown. When the ring at its end is sent over the pin the spout is raised and when unhooked the spout falls until the ring is arrested by the staple. Enamel the base in green; the ladder, spout and post in black; the tank, light red. Line a water gage and number on the tank with black.

Fig. 5 illustrates the interesting locomotive crane; its general construction is clearly shown. The upper platform revolves about a stove bolt, using two blank nuts as washers (slightly round the faces which meet). Three round-headed staples driven in the pine base block, give bearing points for the oak floor to revolve upon. The windlass is a ⅛" brass rod, bent as shown. Screw-eyes take the place of pulleys, and a fine brass chain gives the hoist. Enamel the base block light red; the floor, green; the jib, white; the windless, red. Line the jib in black to illustrate steel braces and paint a black ladder on one side of the base block.

The bridge is very simply made as shown in Fig. 6. The opening under the span is the correct size to set across a standard threshold. This bridge should not be made with a shorter slope (in proportion to its height) than shown, or the grade will be too steep for a toy train to negotiate. This is made of ¼" pine. In passing it should be pointed out that the widths of the bridge and tunnel are correct for standard (medium) gage electrical track. These pieces should be smaller or larger if the other two usual gages are to be carried. The brige was enameled entirely in red, with the structural shapes and rivets shown in white.

Fig. 7 shows an over-pass bridge which also serves as a short tunnel. The width of the overroadway was made to permit a small iron horse and wagon to cross. The same thickness of wood is used for this toy as used in the bridge. The base is enameled green; the archways are light red with arch and keystone lines in black; the interior of the tunnel is red, and the overroadway is yellow.

Fig. 8 illustrates the transformer house. This is not only a realistic addition to the "system" but serves to pro-

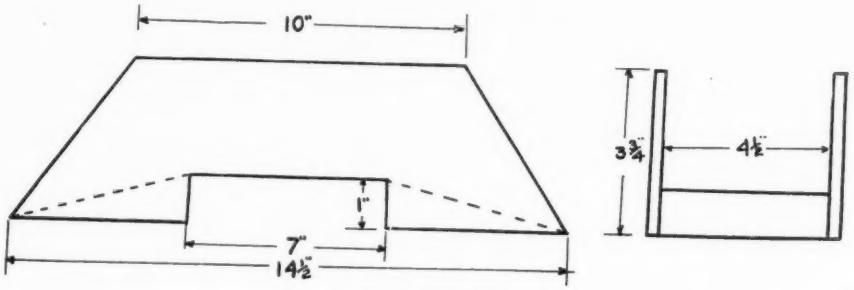


FIG. 6. BRIDGE.

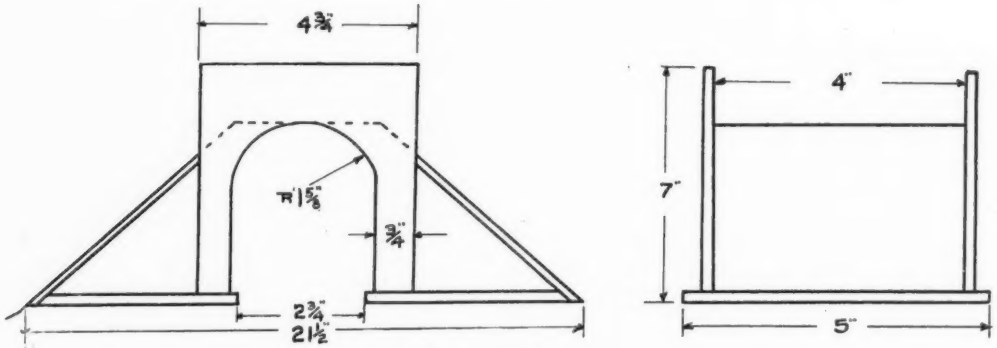


FIG. 7. CULVERT.

tect the transformer from accidental manipulation or short circuiting. The roof is fastened to the four corner uprights, between which the sides of ⅛" wood are fastened, and the entire unit lifts off from the base when necessary. The secondary wires pass through two holes in the front of the house to the telegraph pole upright on the base extension and from there to the rheostat and tracks. The back of the house has no siding which allows the primary wire from the transformer to the light socket to stay in position when the top is removed. This opening, together with the two windows, insures ample ventilation of the trasformer. If made for batteries the house should be proportionately higher than shown in the cut. The entire unit is enameled red, the door is painted in black, using one of the windows as its upper half. The sign is painted in black on a yellow ground.

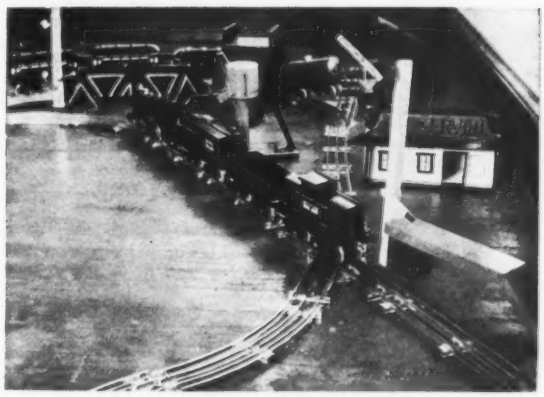
Of course, these structures are capable of infinite variety and may be made more or less elaborate according to the skill and desire of the pupil. As a whole this project includes in simple form the use of almost every ordinary tool. It furnishes for boys in the grades a fascinating constructive series, and, by starting with the simplest form such as the bridge, can be graded through to the most complicated, such as the watertower or station. When coupled with short talks on simple railroad practice and explanations of the use and reason for each article a correlated subject is pleasingly opened to those who desire to read or investigate further into the great field of railroad engineering.

INSTRUCTIONS FOR POTTERY FIRING.

The New York State Education Department, through the Division of Vocational and Extension Education, has issued a sheet of instructions on pottery making and firing which should prove helpful to elementary teachers who are attempting to carry out effective instruction in this subject of industrial arts. So far as is known, this is the first attempt at developing satisfactory firing in a cook stove or furnace. The present pottery project is believed to be a marked improvement over former clay modeling work. The sheet of instructions provides for work in the fourth, fifth and sixth grades.

Pottery Project.

Under the new plan worked out by the state education department a study of pottery as a class project may well be undertaken in the elementary grades in grades four, five, and six separately, or in the three combined for the industrial arts period. The pupils will find it possible to make dishes or vases with the assurance that their work will be preserved by firing. In the process of firing a kiln will be found unnecessary if the proper clay is used. It is suggested that teachers try local clay which can be procured by the pupils in the neighborhood of their homes. The potter's clay" now furnished by the Dobson-Evans Company, Columbus, O., has been tested and found satisfactory for this work. The following method is used in firing the dishes in a range or other stove. For directions in making the dishes, consult Winslow's "Elementary Industrial Arts;" Bush's "Industrial and Applied Art Books;" Snow & Froehlich's "Industrial Arts Textbooks," and Binn's "Potter's Craft."



THE RAILROAD IN OPERATION.

Directions for Firing.

1. Place the vase in a "tin" can (pressed can without solder.) This will serve as a minature kiln.

2. Fill tin can half full of fine sand to prevent the vase from heating and cooling too quickly.

3. Place the vase in the sand in can and put cover on can.

4. Place can containing vase in an oven or other warm, dry place for slow heating preparatory to final firing.

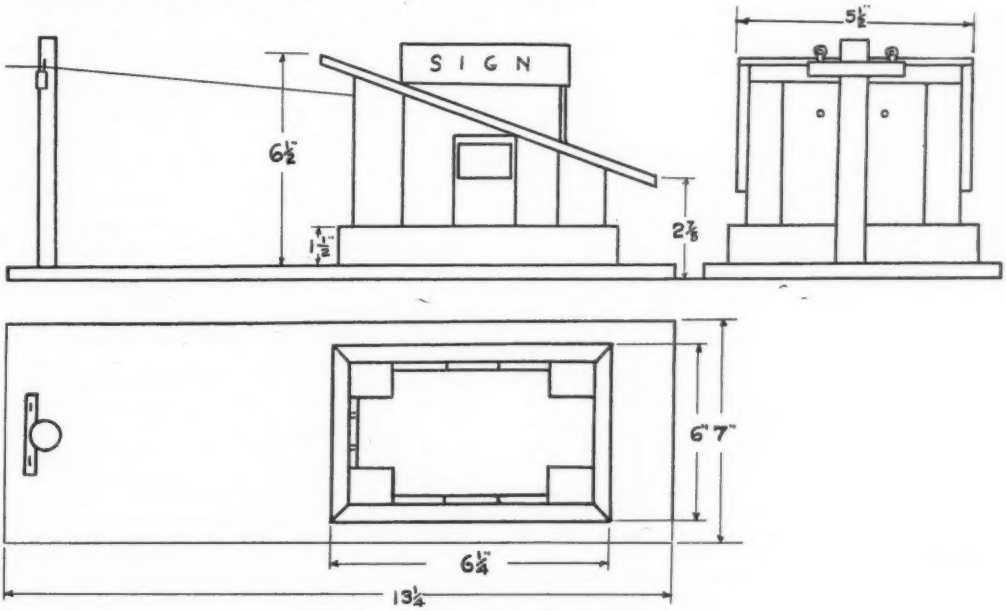


FIG. 8. THE TRANSFORMER HOUSE.

5. Bank coal fire in the stove for the night, or as if for the night.

6. Place can containing vase on top of the coal in the stove.

7. Turn on draft gradually. This will cause the heat to increase gradually.

8. When the can has become red hot, keep it at this temperature for at least an hour.

9. Open the check drafts gradually to back the fire gradually.

10. When the fire has gone almost out remove the can and place it in the oven. This will allow it to cool gradually. (The fire may now be replenished.)

11. Remove can from the oven to the back of the stove where it will continue to cool slowly.

12. Remove the cover from the can.

13. Remove the dish from the can.

The Gradual Heating and Cooling of the Clay Vase is Most Important. Avoid Drafts.

Vases may be decorated before firing, if desired.

Decorations can be worked out in colored crayon, on plain or squared paper.

Finished dishes may be used as "models" for representative drawing.

Although this project is best suited to the upper elementary grades, it may be used sometimes with profit in grades seven, eight and nine, if the design is properly emphasized.

The Vocational Education Convention at Detroit

The week beginning November 27th was a great week for vocational education in this country. Detroit was the scene of operations and every interest that has even remote connections with vocational education was represented there and had its innings on the program.

It was a joint meeting of the National Society for Vocational Education, the Vocational Education Association of the Middle West, the National Vocational Guidance Association, and the American Home Economics Association.

The days immediately preceding the opening of the convention proper on November 29th were spent by the numerous early arrivals in acquainting themselves with Detroit as a city, and with its wonderful system of schools, in visiting the great industrial plants in which this city abounds, and in holding preliminary conferences. Notable among the latter were the meetings under the auspices of the Federal Board for Vocational Education, the United States Bureau of Education, and the National Association of State Directors.

Who all were there? Well, the lobbies of the headquarters were usually filled with a host of those socalled old-timers whom everyone interested in vocational education knows and who have not been absent from such meetings for a generation. Among these were Richards, Prosser, Snedden, Bennett, Bogan, Leavitt, Gustafson, Wright, and numerous other well-known men and women in the vocational field. And then there were the newcomers, eager and anxious to hear what the old-timers have been discussing at annual conventions and elsewhere for a generation.

The program was a great array of talent from every part of the United States. In the main, the evenings were given over to general meetings where topics of common interest to all groups were discussed. Sectional meetings held both morning and afternoon, were given over to the consideration of the specific problems of the following eight groups: Agricultural education, commercial education, home economics education, industrial education, vocational guidance, training in industry, teacher training, and industrial rehabilitation.

There was a distinct note of concern with reference to the reaction which has been under way and the policies of retrenchment adopted in some quarters with reference to vocational education. At other conventions, it has been a common plea for the cooperation of the commercial, industrial, labor and other non-school interests. This convention was different in that the feeling was quite general that the vocational education movement has been and is receiving hearty cooperation from those interests outside the school but has been and still is failing in some degree, at least, to receive the proper recognition and cooperation from the executive and administrative forces of the schools themselves.

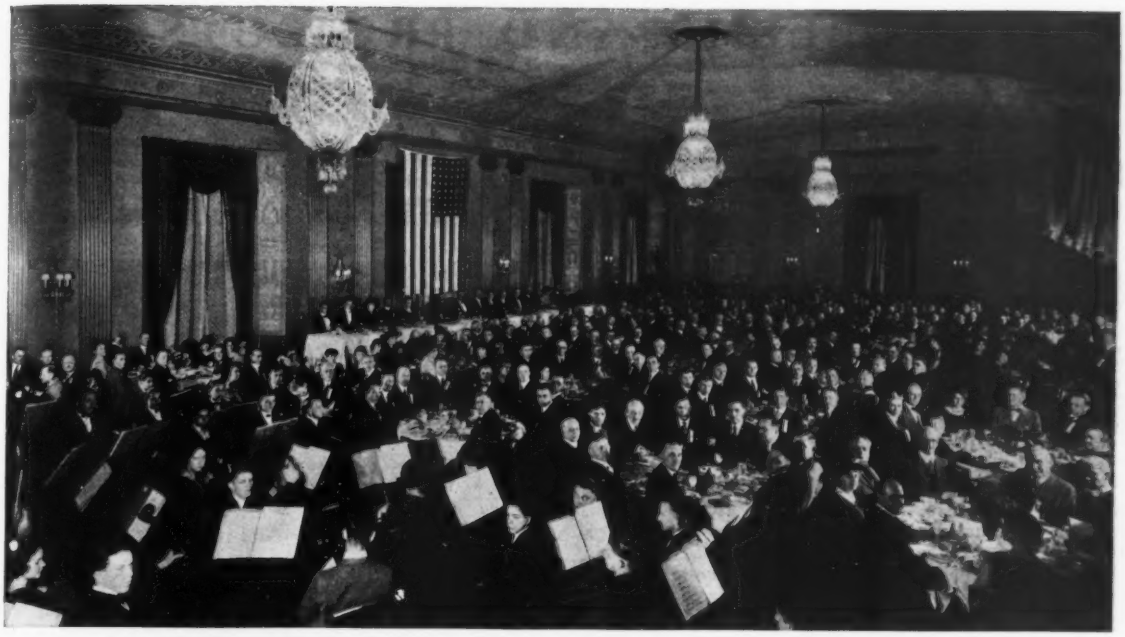
Considerable interest was manifest, therefore, in the proposition to unify all the various agencies for the promotion of vocational education, and to seek with united effort to affiliate with the National Education Association. Dr. Wm. B. Owen, President of the National Education Association, addressed the convention as to the possibility and advisability of such an affiliation.

At the call of the National Society for Vocational Education, a committee from this organization met with committees from the Vocational Education Association of the Middle West, the Vocational Guidance Association, the Eastern Arts Association, and the American Home Economics Association with a view to forming some sort of federation or union of the various interests concerned. A tentative plan was formulated whereby such associations may join with the National Society in its program of work and its annual convention without interfering with the independence of the respective regional or state organizations, or preventing their own annual meetings.

Less was heard at this meeting than for some time past concerning test measurements and analyses. What was said was mainly to report actual uses of such devices. The program committee seemed to have in mind a purpose to bring to this convention the *results* of programs of work already in operation, rather than theories projected for some future time. The average speaker on the Detroit program seemed impressed with the idea that it is time to begin to evaluate the work which has been in progress and to report on the accomplishments or failures.

Probably in no other meeting of these associations has the importance of the teacher in any program of education been so stressed. Especially in those parts of the program where part-time schools and teacher training were discussed was the absolute necessity for skilled teaching and well trained teachers emphasized. The feeling prevailed that the continuation school in this country succeeds to the extent that highly trained teachers of strong personality and superior skill in instruction are employed. The impossibility of taking regular public school teachers without some special training for the part-time classes was repeatedly pointed out.

The exhibits—both educational and commercial—were a notable feature of the convention. The Detroit schools made an elaborate showing of the products of the various forms of manual activities through the entire school system. One was adequately repaid for the trip to Detroit by the opportunity to see the shops and laboratories of the schools in operation and to get a comprehensive idea of what is going on in this great city in the way of manual and industrial arts, home economics, art, and vocational work. The commercial exhibits occupied the entire gymnasium of the new Cass Technical School and overflowed into the corridors. Practically every line of equipment and supplies used in vocational education was fully represented.



THANKSGIVING DAY BANQUET OF THE ASSOCIATED VOCATIONAL ASSOCIATIONS AT DETROIT.

Once more Detroit has proved herself to be a great convention city. The adequate hotel facilities conveniently centralized, the numberless industrial and manufacturing establishments with their various systems of training, employment, and management, the great system of public schools, and the most cordial and generous staff, from Superintendent Cody, Principal Comfort, Mr. Trybom and other administrative and supervising officers down through the teaching force, all combine to make Detroit a great city especially for educational meetings.

The following officers were elected for the National Society:

President, C. A. Prosser, Minneapolis; treasurer, John Clyde Oswald, New York; secretary, Clotilde Ware, New York.

The Vocational Education Association of the Middle West elected officers as follows:

President, John N. Greer, assistant superintendent, Minneapolis, Minn.; First Vice-President, Lewis Gustafson, superintendent of David Ranken Junior School of Mechanical Trades, St. Louis, Mo.; Second Vice-President, Irving R. Garbutt, director of commercial education, Cincinnati, O.; Third Vice-President, Katherine Blunt, professor of home economics, Chicago University; Treasurer, James M. McKinney, educational director of American Correspondence School, Chicago.

Executive Board: Wm. J. Bogan, Chicago; W. A. Greeson, Grand Rapids, Mich.; W. A. Smith, Joliet, Ill.; Ella Babcock, Milwaukee, Wis.; J. A. Starkweather, Duluth, Minn.; J. A. James, Madison, Wis.; E. G. Allen, Detroit, Mich.; G. F. Buxton, Indianapolis, Ind.; C. R. Wiseman, North Dakota; Helen Livingstone, Detroit, Mich.

VOCATIONAL GUIDANCE AT ERIE, PA.

The occupations class of the Central High School, Erie, Pa., during the year undertook a number of studies along the line of vocational guidance and placement. A study was made of the human machine in comparison with an engine taking up particularly the topics of alignment, maintenance, successful operation, lubrication, feeding cost, balance and depreciation.

Another time the class visited the local telephone company's plant. The class separated into groups, each headed by a foreman of the plant who explained all the puzzling points about telephone service and maintenance.

Some time was also given to a study of banking. The class visited one of the local banks and was shown each department, giving particular attention to the safety deposit department and the system upon which it is operated.

Another visit was made to a modern hardware store where the students were initiated into the mysteries of a hardware business. The duties of the several departments were explained to the students by the assistant manager who also discussed the subjects of buying, selling and advertising.

The occupational work at Erie is being conducted under a socalled "guidance program" which serves as a guide in planning and successfully carrying out the work. The program is as follows:

1. **Establishing of filing system with records of students.**
   - **(a) Personal history of student.**
   - **(b) Educational history—parental ambition.**
   - **(c) Teachers' estimate of pupils' characteristics.**
2. **Survey of Vocational Opportunities of Erie.**
   - **(a) Analysis of condition, advantages and disadvantages in shops, stores, offices.**
   - **(b) Study of local appreticeship.**
   - **(c) Study of Erie occupations.**
3. **Conferences with parents and pupils for the purpose of:**
   - **(a) Keeping pupils in school.**
   - **(b) Assisting those who must leave to find work they are fitted for.**
   - **(c) Removing the causes of failure in school work.**
   - **(d) Improving the personal habits of pupils.**
   - **(e) Assisting pupils in their choice of studies and courses and in the adjusting of their programs.**
   - **(f) Giving information about higher educational institutions.**
4. **Establishment in each school of suitable libraries containing inspirational books on occupations, college catalogs, etc.**
5. **Following the careers of those who have left the Erie school and encouraging them to continue their education.**
   - **(a) By returning to school.**
   - **(b) By availing themselves of night school opportunities.**
   - **(c) Through correspondence schools, business colleges, etc.**
6. **The investigation of all applications for school exemption and employment certificates with a view of reducing the number who leave school unnecessarily.**
7. **The creating of a widespread and intelligent interest in the guidance of Erie boys and girls.**

PROBLEMS AND PROJECTS

The Department of Problems and Projects aims to present each month a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration. The editors will not accept the old hackneyed problems of footstools, taborets, towel holders, etc., which have been made from time immemorial, ad nauseum.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

BARREL RACK.

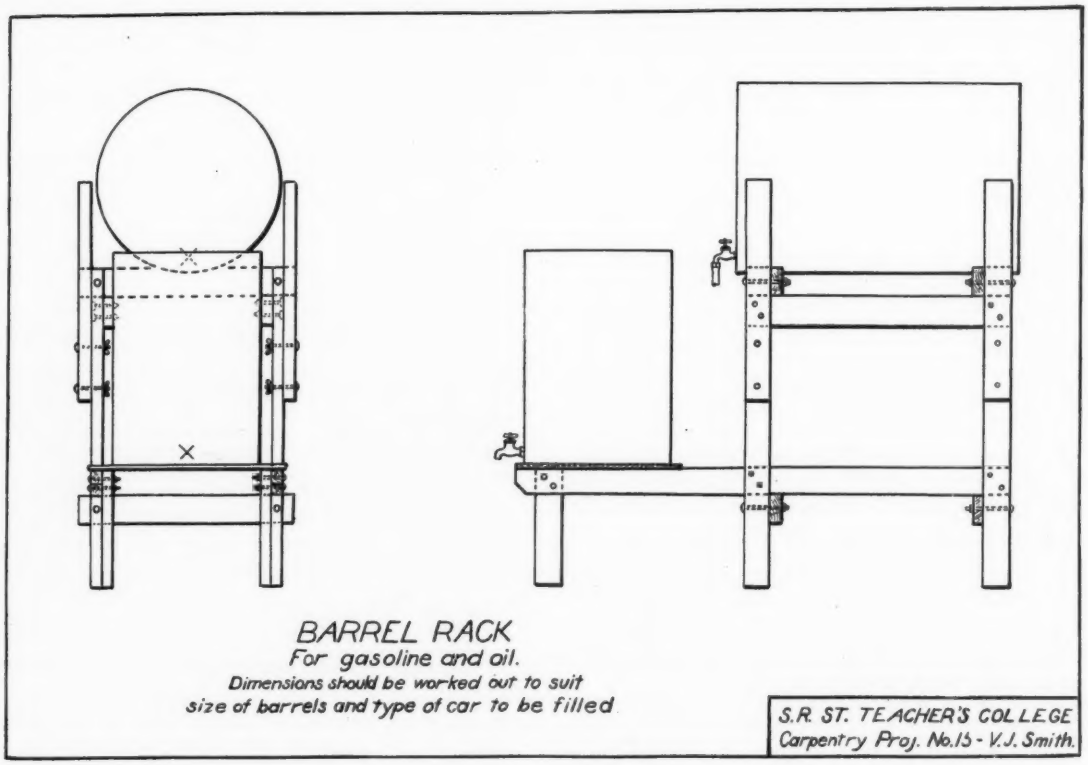
Victor J. Smith, Sul Ross State Normal College, Alpine, Texas.

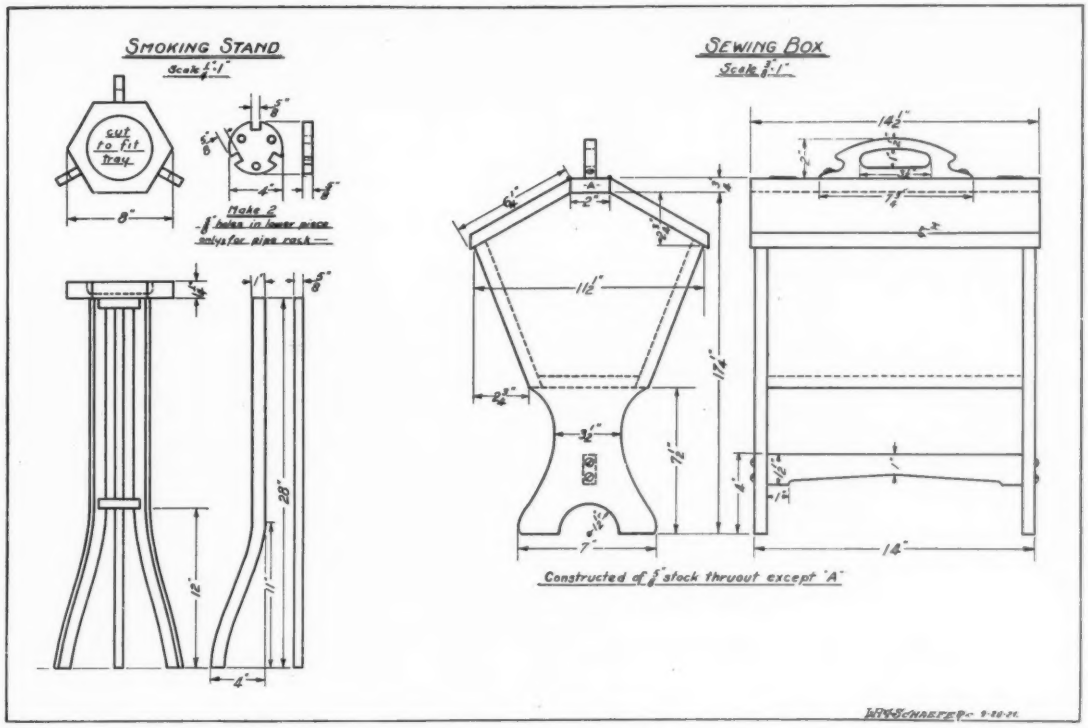
As a practical and useful project in farm carpentry the barrel rack, illustrated in the accompanying photograph and drawing, has proven to be a successful one. The rack was designed to meet the need of the home garage, the farm, or the ranch where gasoline, coal oil, or lubricating oil must, for economy and convenience, be purchased in large quantities and stored for gradual use. While such a method of storage might not meet the fire rules of a city, it has, nevertheless, been used successfully in rural communities where considerable money is saved by the purchase of barrel lots. The rack has sometimes been placed in small galvanized iron or concrete buildings and sometimes has been used in the open or in temporary sheds. Instead of standing on unsatisfactory horses or boxes, the barrels are now up where the liquids may be conveniently drawn off into a container or directly into the tank of the automobile through a short hose.

The height of the supports for the larger (gasoline) barrel is determined by the make of the car as a Ford, for instance, requires a longer 2x4 for the legs than might be necessary for another make of car. Another consideration which will enter into the determination of the height will be the height of the bed of the truck on which the barrel is hauled. If the horizontal supports of the rack are

BARREL RACK IN USE.

properly placed the heavy barrel may be rolled directly from the truck to the rack using the two upright pieces


BARREL RACK
For gasoline and oil.
Dimensions should be worked out to suit
size of barrels and type of car to be filled
S.R. ST. TEACHER'S COLLEGE
Carpentry Proj. No.15 - V.J. Smith.



TWO GIFT PROJECTS.

(which hold the barrel in position while in use) as skids between the truck and the rack. In order that this may be quickly and easily done the four uprights are held in place with wing nut bolts, making the rack accessible from either side. The project may be developed into a unit which will hold two, four, or more barrels.

TWO GIFT PROJECTS FOR THE WOOD SHOP.

W. M. Schaefer, Alton Community High School, Alton, Illinois.

About this time of the year teachers are usually confronted with the "make-something-for-Christmas" fever that invades the shop, and the writer has found both projects shown in the accompanying drawing to offer satisfactory solutions to the problem; both being useful gifts as well as excellently adapted to upper-grade or high school work.

The Smoking Stand: In the writer's classes the smoking stands were usually constructed of gum wood and finished in either walnut or mahogany, each piece being finished separately and finally assembled so as to avoid the possibility of corners being filled with the undesirable fillets of shellac or wax. Water stain was used to give the desired color and when thoroughly dry one or two coats of shellac was applied, the whole was then sanded lightly with 00 sandpaper and given a coat of prepared wax. Assembling was done with 1½" brads, set well, and the holes filled with putty colored to match the stain. The trays were usually purchased complete with glass liners although some of the pupils fitted the stand with shallow glass trays obtained from the ten-cent-stores and constructed their own match box holders and cigar rests of thin sheet brass securing them to the top with small brass escutcheon pins.

The Sewing Box. The sewing boxes were usually made of some light wood such as cypress or redwood and finished in shades of brown with the shellac and wax polish. Although the project works admirably well when made to the exact dimensions on the drawing some of the pupils preferred to increase the height of the box by increasing the height of the foot to ten inches. In some cases the boxes were fitted inside with shallow trays for scissors, thread, yarn, etc.

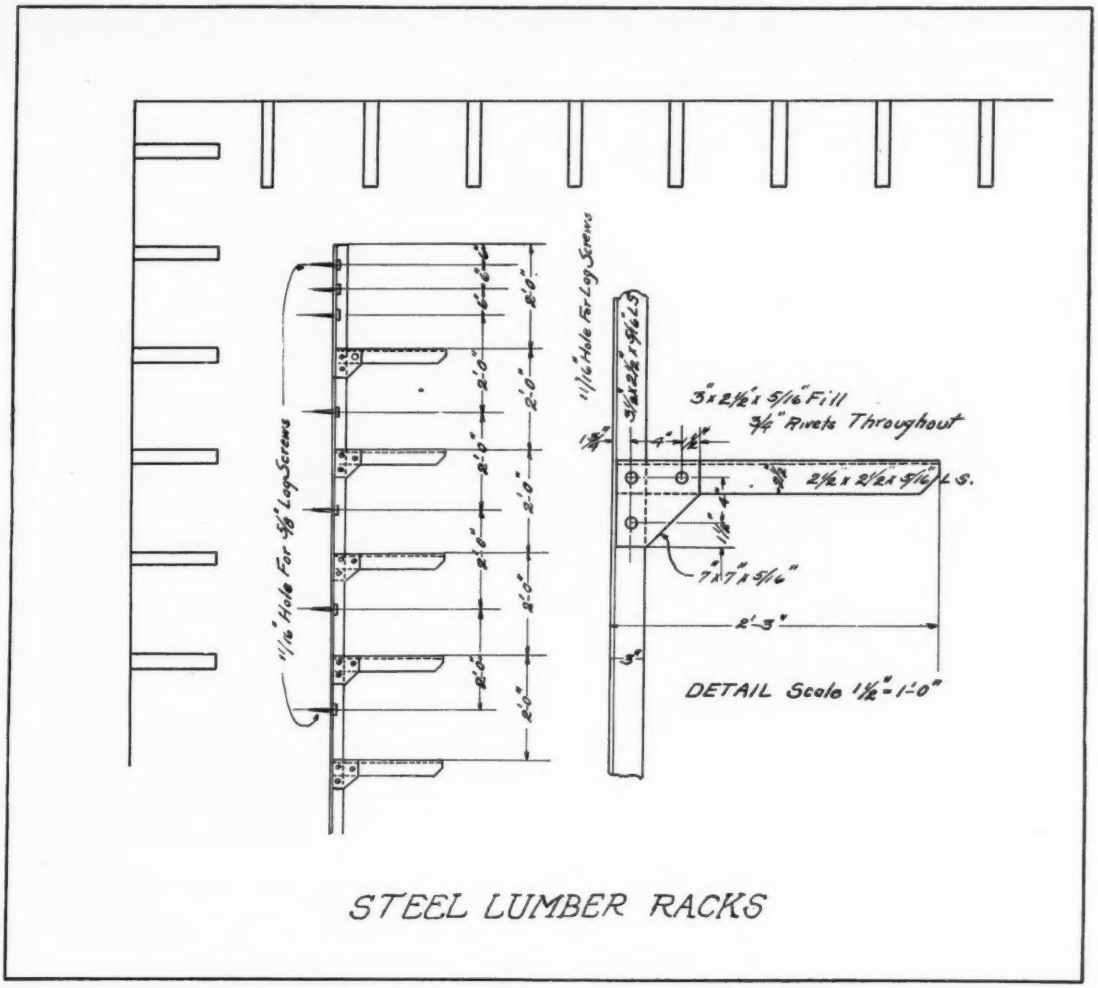
STEEL LUMBER RACKS.

Geo. H. Wichmann, Coleraine, Minn.

The advantages of the steel racks over the racks constructed from wood are obvious, when one considers the enormous load carried on lumber racks filled with hardwood lumber. The steel racks are rigid and when properly designed, constructed and erected will remain aligned under full load. Again, because of the strength of the material used, such racks are more economical of space and more accessible.

The racks shown in the drawing were designed to carry a full load of oak. Thus, if eight racks are spaced so as to support sixteen foot lengths, a total load of ap-

STEEL LUMBER RACKS IN THE AUTHOR'S SHOP.



STEEL LUMBER RACKS

proximately eight tons would be imposed on the racks. This would amount to a ton per standard. Also the shear on each outside rivet of the cantilever shelf would need to withstand a shearing movement of two thousand pounds. The shelves were designed but 24 inches in length so as to make the lumber more accessible, at the same time keeping the bending and shearing movement as low as possible.

The weight of each standard is about one hundred pounds so that the material for each standard will cost approximately four dollars. The racks are easily constructed and may be built by any structural steel or blacksmith shop at small cost.

BENCH SCREW.

W. R. Challoner, Appleton, Wis.

This machine shop problem is one that any hardware dealer will be able to dispose of for you if it is properly made up. The wood handle will also furnish a job for the wood turning class early in the course. This bench screw can be made in different sizes and the data can be obtained from any machinist's supply catalog. I prefer this size because it is the size most commonly used. The problem furnishes a variety of lathe work, both in the centers and in the chuck; also layout and drill press job, together with assembly.

In starting this job, I would suggest that the screw be made first. Leave enough stock on the ⅞ inch diameter so that it can be filed and fitted to the handle casting after the threads have been cut. Before starting to cut the threads, drill a $\frac{1}{8}$ inch hole $\frac{1}{8}$ inch deep at the stopping point of the thread. Then place in the lathe so that the thread will finish at this hole. By so doing, a good stopping point is obtained, and the danger of breaking the tool in stopping at the shoulder is eliminated. If the lathe is pulled by hand at the last half turn before reaching this hole, no trouble will be had at this point. The thread should be roughed out with a tool 3/32 inch wide and finished with one 5/64 inch wide in order to get a good smooth thread.

When cutting the thread in the nut, use a tool ⅛ inch wide. To obtain the best results, a good substantial bar should be used; one held in a casting and mounted on the compound rest of the lathe will make the best kind of a bar for this work.

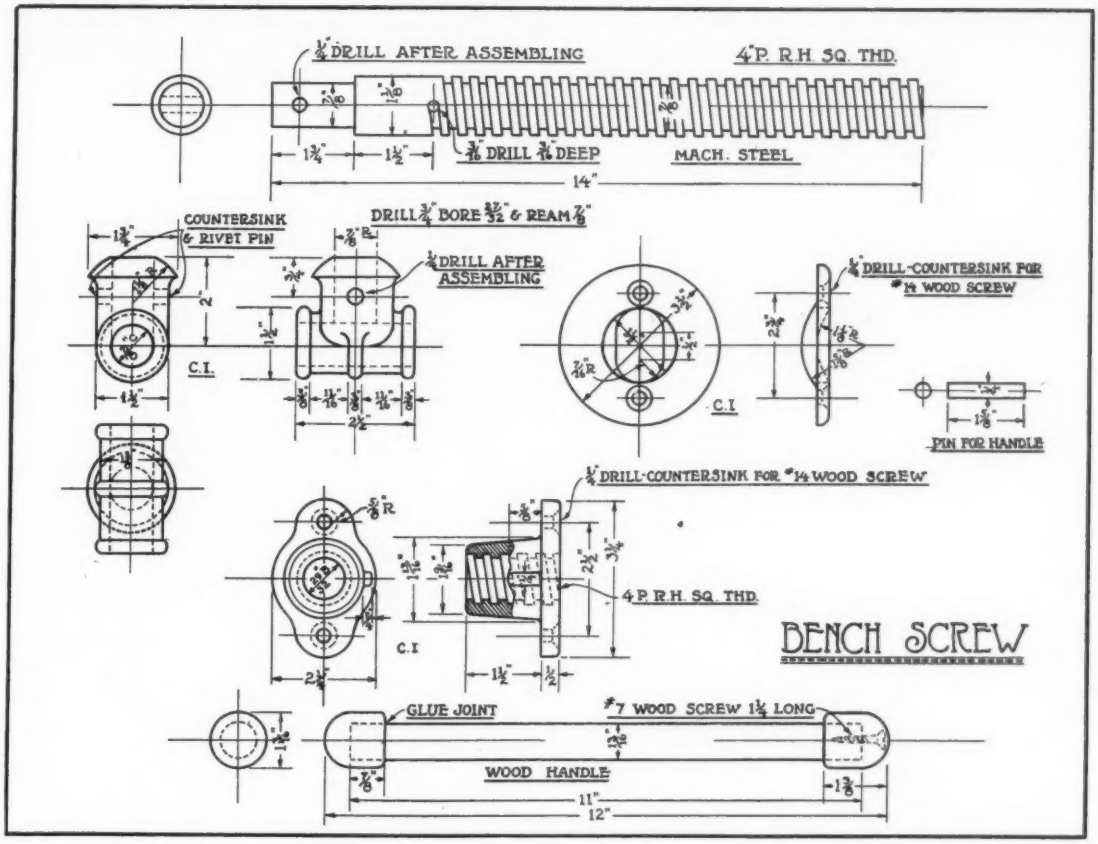
The handle casting should be chucked so as to run true at the radius end, and the end smoothed off with an old file. The hole may be drilled, bored and reamed to insure proper size.

When assembling, place the washer of the pressure plate on the handle end of the screw. Then drive on the handle casting so that the pressure plate fits the radius of this casting and forms a loose fit between the handle and the shoulder of the screw. Then drill the ¼ inch hole and countersink both sides just a little to form a head for the pin so that it cannot work out.

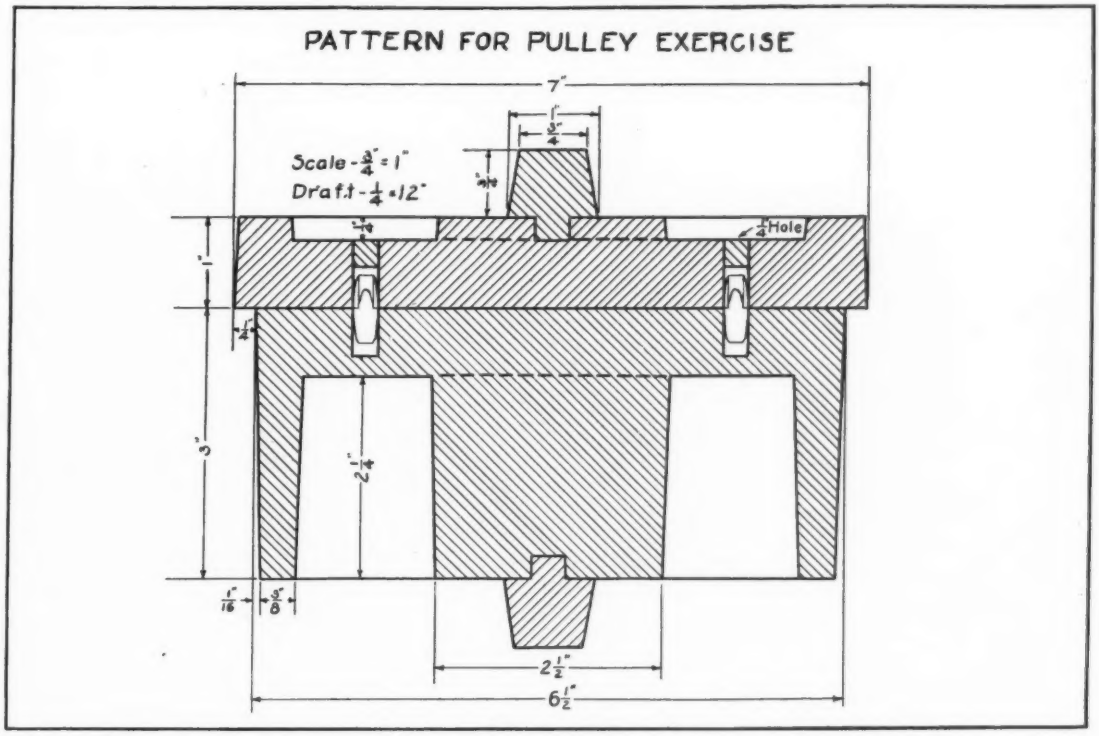
AN EXERCISE IN PATTERN MAKING.

Robert S. Condon, Decatur, Ill.

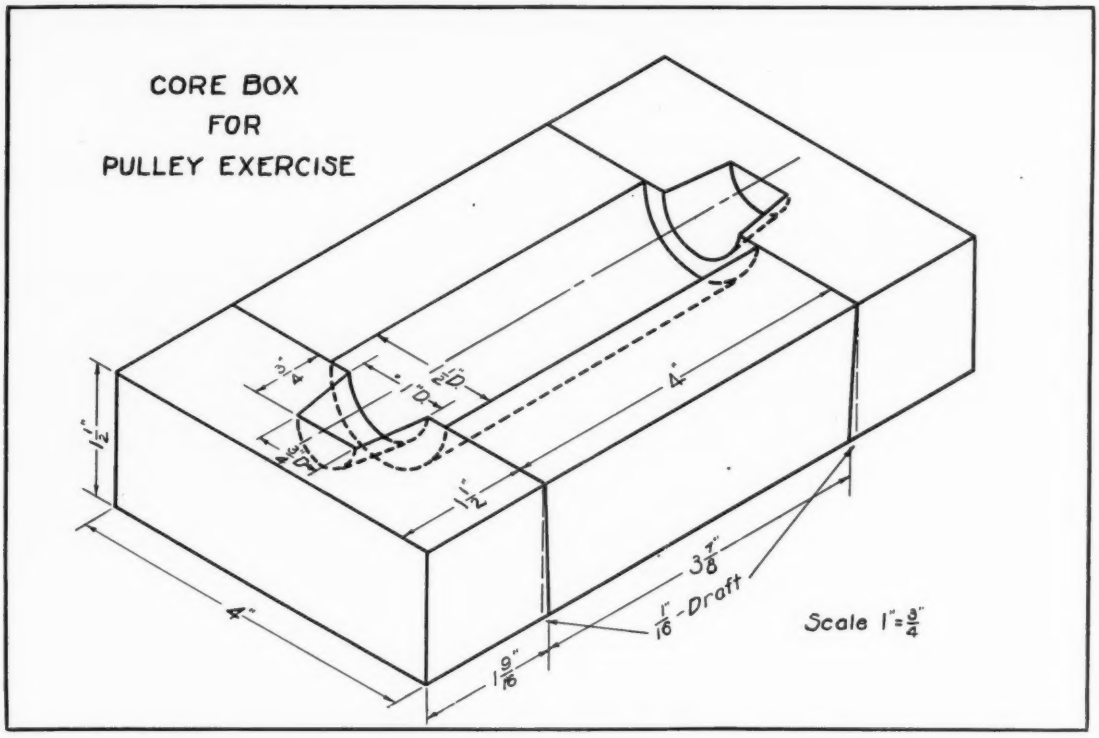
In the presentation of the principles of pattern making to a class of high school boys a few exercises logically follow the explanation and the demonstration of the rules



DETAIL OF BENCH SCREW.



DETAIL OF PATTERN FOR EXERCISE.



CORE BOX PATTERN.

for making patterns. It is advisable, whenever practical, to substitute some commercial shape that involves certain processes in its construction for each exercise. The pulley exercise shown herewith is offered as the first lathe project in a pattern making course. It is intended that the student shall have worked out one or two simple projects with plane surfaces and mastered the purpose and application of draft. This exercise has the advantage of illustrating several methods of procedure in the art of making a pattern. It demonstrates the split pattern, the way the dowel pins are set in, and how the core prints are put into place. The pattern necessitates outside and inside cutting to a diameter measurement. The core box shown in the drawing, forms the core that will make the shaft opening in the pulley. The core box plane may be used to hollow out the central portion of the core box. The core prints may be cut accurately to size by the use of tin templates. The core box is made to provide for a slight draft on each end of the core.

INDUSTRIAL EDUCATION DIVISION OF OKLAHOMA.

On November 2-3-4 the Industrial Education Division of Oklahoma held its third annual session at Stillwater, the seat of the A. & M. College. The attendance was the largest in its history, over seventy-five men from over the state taking an active part in all programs.

Professor DeWitt Hunt of A. & M. College, president of the division, spoke of the "Future Objective for the Organization," and outlined a future in the field of industrial education for the state of Oklahoma. "Shopwork in Agricultural Education" by Professor J. W. Bridges, state supervisor of vocational agriculture was of interest and of profitable value. Mr. Bridges is doing a wonderful work in this field in Oklahoma. Mr. Wm. S. Rosamond, vocational director of the Oklahoma City schools, told of the many problems that he was confronted with in conducting classes, or having them conducted by experts in the various vocations, and the many opportunities that exist in this state.

The state board of education adopted in the latter part of the last school year a plan of certification that was submitted by this division. Mr. Everette E. Tourtelotte, high school inspector for the state board of education spoke of the "Effects that Certification of Manual Training Teachers would have in Oklahoma." He gave out the following figures relative to the training of the men in this field in Oklahoma: from the first 78 men that he examined, that teach socalled manual training, he found that 21 had no high school training, 15 had attended high school, and 42 had college training ranging from one through the four years. The speaker assured the division that the state board of education appreciated the forward movement which this body of men is making.

The following divisions were made and each group worked out courses of study for the seventh and eighth grades and for the four years of high school work: woodwork, mechanical drawing, metal work, printing, and trades.

Professor Ira S. Griffith, of the University of Wisconsin, was the chief speaker on the five programs that were rendered. Those present pronounced the speaker a psychologist as well as a master of the manual arts field. Mr. Griffith made very clear the different phases of learning processes. Those that heard his messages are bound to render a better service in this department in the future.

The local A. & M. College Manual Arts Club had charge of a banquet which was served at 6:00 p. m. Reservations were made for one hundred. A wonderful spirit prevailed among those present—similar to that of the "old man," which all of Oklahoma school men understand.

The following resolutions were adopted that will be of interest to every industrial teacher in the state: 1. Be it resolved, that this body of men go on record as being in favor of the state board of education employing a man in connection with the high school inspection; a capable supervisor for the purpose of working with the vocational education teachers in this state. 2. That this division of the O. E. A. favor and recommend the establishment of a state vocational institution for the purpose of providing teachers in the many vocational fields.

The following officers were reelected: DeWitt Hunt, superintendent of shops, A. & M. College, Stillwater, president; Harry W. McKimmey, head of cabinet work, Oklahoma City High School, Oklahoma City, vice-president; Hugh Norris, director of manual arts, State Teachers' College, Ada, secretary-treasurer; C. O. Holley, supervisor of manual arts, Sapulpa city schools, Sapulpa, Executive Council, term expires 1924.

Hugh Norris.

SCHOOL CRAFTS CLUB HEARS FINE LECTURE.

Installation of Officers for 1922-1923.

A large group of members and friends of the School Crafts Club of the metropolitan district met at the Ethical Culture School, 33 Central Park West, New York City, on Saturday evening, Nov. 18. The men heard a most interesting high class educational lecture, illustrated with stereoptican slides, delivered by Mr. H. Carroll of the New York Telephone Company, on "The History of Communication." Mr. Carroll led his audience from the means of communication in the time of the Pharaohs to our marvelous systems of telegraphy and telephony of the Twentieth Century.

Among the forms of transmitting intelligence described are messages carved in stone, Beacon fires, runners, mounted couriers, men who travelled on stilts, beating tree trunks, whistling, tapping on iron pipes; and such modern mediums as the telegraph, the telephone, the wireless telegraph, and the wireless telephone. This lecture deals with one of the most interesting chapters in the history of the world, and is illustrated with many beautiful and unusual pictures.

MR. PHILIP M. WAGNER,
President, School Crafts Club of New York.

Following this splendid entertainment, the new officers of the club 1922-23 were installed as follows:

Philip M. Wagner, President, Manual Training Instructor, Cleveland Junior High School, Newark, New Jersey.

Edwin F. Judd, Vice President, Industrial Arts Instructor, High School, Montclair, New Jersey.

Charles H. Kennington, Treasurer, Manual Training Instructor, John Collin School, Newark, New Jersey.

Frederick C. Arnold, Secretary, Instructor of Mechanic Arts, Evander Childs High School, New York City.

Program Committee.

Robert A. Campbell, Chairman, State Supervisor of Manual Arts of New Jersey, 308 Williams Street, East Orange, New Jersey.

Richard O. Reger

George L. Dobblelear.

Membership Committee.

Russell F. Hemmion, Chiarman, Director, Cooperative Apprenticeship Course at High School, Paterson, New Jersey.

Frank A. Baker.

J. B. Middleton.

MR. CHAS. F. BAUDER,
Director of Industrial Arts,
Philadelphia, Pa.

Publicity Committee.

Lloyd F. Stair, Chairman, Instructor of Manual Arts, Public Schools, Madison, New Jersey.

Albert N. Petterson.

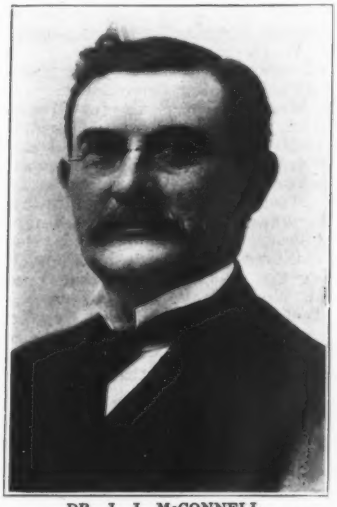
Samuel Tanenbaum.

The School Crafts Club aims to get together the directors and instructors of Shop Work and Mechanical Drawing in the Public Schools of the Metropolitan District of New York and northern New Jersey for both professional advancement and social ends. The Club has a large membership and is constantly growing more attractive in its functions.

DR. MC CONNELL HEADS VOCATIONAL DEPARTMENT.

Dr. J. J. McConnell, for many years superintendent of schools at Cedar Rapids, Ia., has been appointed state director of vocational education and secretary of the State Board for Vocational Education of Iowa. He will have charge of all activities in the direction of vocational education, including agricultural, trade and industrial, home making and industrial rehabilitation work.

The educational activities in the state of Iowa include approximately sixty day schools in agriculture, dull-season classes in the trades in approximately thirty cities, full-time day trade schools in four centers, dull-season classes for adults in two centers, part-time continuation schools in seventeen cities, home making in 23 cities, evening vocational classes in all cities.



DR. J. J. McCONNELL,
Director of Vocational Education for Iowa,
Des Moines, Ia.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for subscribers who have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from competent authorities. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Molder Practice.

320. Q:—Can you tell me where I can procure an up-to-date book of American practice in the grinding of cutters for moulding, etc., and the setting up of the machine for running and making of same on woodworking machinery? J. A. S.

A:—The following books are the only practical works on the market which fill your needs:

Machine Molder Practice by W. H. Rohr. $2.50. The Practical Books Co., Box 372, Indianapolis, Ind. **A Modern Shaper Practice.** $2.50. Practical Books Co.

Lettering Chart for Mechanical Drawing.

330. Q:—Can you tell me where and who publishes a rating scale or chart for judging lettering in connection with mechanical drawing. L. A. H.

A:—Lettering rating scales or charts for mechanical drawing teachers may be obtained from P. M. Spink, Faribault, Minn. The charts are sold at $0.75 each; or they may be obtained in quantities at $2. for three, $3.50 for six, and $6 for twelve.

Refinishing Blistered Leg of Walnut Chair.

331. Q:—I have a black walnut finished birch rocking chair. One of the legs of the chair is blistered. Please tell me how to restore the leg to its original finish. O. R. J.

A:— The blistered leg of your black walnut finished birch rocking chair can probably be restored to its original finish by using varnish remover to very carefully take off the finish on the blistered portion only. This should be thoroughly sandpapered and then may be shaded up by using turpentine asphaltum varnish somewhat reduced with turpentine and benzol and if necessary darkened with a little Ivory or Drop black in oil. This may be applied with a piece of old sheeting or similar smooth cloth and evened out in tone so as to match the original finish. This should be allowed at least two days to harden and should be given a wash coat of orange shellac which should be carefully sanded with a 6-0 paper when dry. The leg may be coated with a good floor varnish, sanded when dry and given a second coat. In order that the whole chair may have a fresh, even toned appearance, it is suggested that the entire chair be second coated at the same time as the leg. If the chair has been in use for any considerable time or has been cleaned up with any polish, it should, of course be washed with a sponge and Ivory soap suds and allowed to dry before being varnished. The last coat should be rubbed carefully with 00 pumice stone, felt pad and water and cleaned up with a good polish. — **Ralph G. Waring.**

Manual Training Tests.

335. Q:—Are there any intelligence tests on the market for manual training? If so, where can they be obtained?—F. W. D.

A:—The following is a list of tests which are applicable to the manual training department:

Leavitt's Measurement Scale for Manual Arts, Ind. Arts Mag., Apr., 1919 (copies out of print); **Stenquist's Mechanical Aptitude Tests,** $1.50, World Book Co., Yonkers, N. Y; **Wardner's Test for Knowledge of Tools,** C. A. Wardner, Jackson, Mich.; **Kelly's Constructive Ability Tests,** C. H. Stoelting Co., Chicago; **Pintner-Patterson's Scale of Performance Tests,** C. H. Stoelting Co., Chicago; **Army Mental Tests,** Yoakum and Yerkes, Henry Holt Co., New York; **Hollingworth's Vocational Psychology Tests,** C. H. Stoelting Co., Chicago; **Thurstone Vocational Guidance Tests,** $1, World Book Co., Yonkers, N. Y.; **National Intelligence Tests,** $1.45, World Book Co., Yonkers, N. Y.

The first named test is the only strictly manual training test which is intended to record the results attained in teaching the ordinary manual training tests.

NEW BOOKS.

The Teaching of Mechanical Drawing.

By Carl L. Svensen. Paper, 48 pages. Published by the Ohio Department of Education, Columbus.

This pamphlet presents the results of a survey of mechanical drawing as taught in the secondary schools of Ohio. The survey was made by submitting to thirty high schools in the state, a very complete questionnaire intended to bring out the scope and content of the mechanical drawing courses, the purposes of the courses, and their relation to other academic and vocational work, the standards of quality and rating, the methods of teaching, recitations and examinations, and the use of textbooks.

The survey as Professor Svensen presents it, gives an accurate picture of the work done in 66 high schools, and indicates that there is not much uniformity in the purposes or length of courses, and that great variations exist in many important details of the work. In practically all the schools, the courses are general in character, the teachers are uniformly high grade in professional preparation, and the work is offered on a basis of equality with other subjects.

Simple Farm Accounts.

By Rex E. Willard. Cloth, 106 pages. Also Farm Account Book for Farm and Household Records. Paper, 50 pages. Published by the Author, Fargo, N. D.

The author, who is also his own publisher, has as the result of his experience as farm economist in the Agricultural College of North Dakota, worked out a practical system of farm accounting. It is so arranged that it may become readily intelligible to the average farmer and at the same time serve as a textbook in the rural schools.

The work is arranged in two parts. One deals with definitions and the reasons for classifying accounts, the other illustrates account keeping by introducing ruled pages and the manner of entry. The account headings cover the principal production items, running expenses, improvements, purchases, sales, profits, etc., etc.

In view of the fact that farming is an occupation which involves not only production and marketing considerations, but all the elements that make for efficiency in business enterprise, the Willard accounting system must be deemed a timely contribution to the business of farming, the most important of all industries.

Thurstone Employment Tests.

By L. L. Thurstone. Examination in Clerical Work: Form A Examination in Typing: Form A. Price $1.50 per package of 25 each. World Book Co., Yonkers, N. Y.

The clerical test consists of simple problems in checking arithmetical and spelling errors, in arranging names alphabetically, in marking letters, converting numbers into letters, in addition, etc. The last part is frankly a simple mental test based on well tried and widely used material.

The test in typing consists of copying a page of "copy" interlined with corrections, a simple tabulation and a spelling test.

The tests have the merit of extreme simplicity and brevity and should appeal to business men as well as teachers of commercial courses.

Principles and Practice of Show-Card Writing.

By Lawrence E. Blair. Cloth, 240 pages, illustrated. Price $2.50. McGraw-Hill Book Co., New York, N. Y.

This book is one of the extension education series of texts developed by the University of Wisconsin and has been written with the author's correspondence classwork as a basis. The chapters on letter construction, history of lettering, and modern show card alphabets are clear cut, complete and ample for giving any student a thorough grounding. The chapters on arrangement and color are similarly effective. The cards illustrated in the chapters on card writing practice and commercial practice are not all fortunate and do not seem to be chosen with the care which characterizes the balance of the book. It would seem that the author might readily have found types of cards from such typical retail practice as shoes, haberdashery, dry goods, drugs, rather than theatres and motion pictures.

Thank You, Mr. Shultis!

and we will be glad to do as much
for EVERY Instructor in
Manual Training.

THE following communication reflects the tone of numberless letters received from Manual Training Schools throughout the country that have adopted Disston Educational Literature as standard in their classes.

Ukiah Union High School,
Ukiah, California,
November 15, 1922.

Henry Disston & Sons, Inc.,
Philadelphia.

Gentlemen:

I am teaching agriculture and farm mechanics in this high school and know you have some charts and booklets that will be of great use to me. I refer in particular to the Saw Chart; File Chart; The Pruning Book; The Saw in History; The File in History; Saw, Tool, and File Book; The Lumberman's Handbook, and others.

I am a sincere believer in good tools and am trying to teach my boys in school to choose good tools. Our shop did have quite a number of inferior saws but I am now going in for Disston No. 12 Hand Saws. I consider them the best saws made. I could give you plenty of good testimonials on the Disston Saw from my own experience here and in the Engineer Corps in France as well as from my father and grandfather, all good carpenters. I consider it a public service to aid in the distribution of Disston Saws.

Yours truly,
Arthur Shultis,
Director of Agriculture.

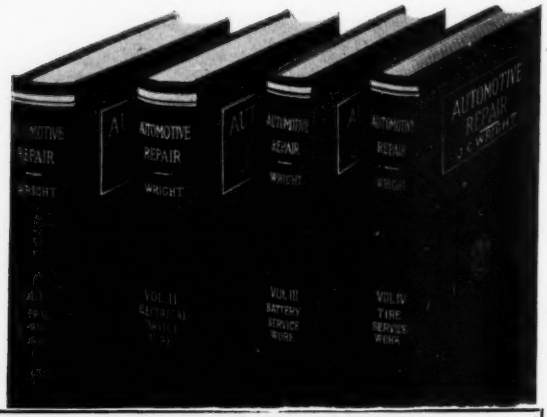
The Educational Department of Henry Disston & Sons, Inc., has taken infinite care in the preparation of the following Charts and Hand Books. Any of these will be sent you in desired quantities for your classes. We give you these freely and place our Educational Department at your service at all times.

Kindly address "Department L"

Saw Chart
File Chart
The Pruning Book
The Saw in History
The File in History
Saw, File and Tool Book
The Lumberman's Handbook
How a Disston Hand Saw Is Made

Henry Disston & Sons, Inc.

"DEPARTMENT L" PHILADELPHIA, U.S.A



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Director, Federal Board for Vocational Education

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Comprises a number of battery service jobs, together with a thorough study of batteries versing the student with a working knowledge of the principles.
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Concerning "Automotive Repair," Vols. I and II

Vol. I—For the General Repairman and the Owner, was published in October, 1921, and has been adopted in 98 institutions. It has 530 pages, 6 by 9, and is profusely illustrated.
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IAM 1-23

NEWS AND NOTES.

Shop Room Installed. In the Monroe Grammar School, near the high school at Lexington, Mass., a general shop is in process of development. A room formerly used for "sloyd" has been enlarged and rearranged. Some power machinery has been added and a small printing equipment installed, and two or three other activities will be brought into play to add variety to the vocational guidance and general shop training. The work is in charge of Mr. Frank R. Smith, who was formerly in charge of prevocational work at New Britian, Conn.

First Printing Press in San Francisco High Schools. A printing press, the first in the high schools of San Francisco will be in operation at Polytechnic High School soon. Students with previous experience will do all the printing for this semester, or at least until the Board of Education provides an instructor in the trade.

Offer Film. A film showing the manufacture of the Cadillac automobile has been completed recently and has been released for use in technical schools and in other technical institutions by the U. S. Department of Commerce at Washington, and the Cadillac Motor Car Company, Detroit.

A new household arts course has been introduced into the Pittsfield, Mass:, high school. This is a state-aided course which has fifty per cent of academic and fifty per cent of vocational work. Charles H. Perry has been elected supervisor of manual training for the Pittsfield public schools.

A continuation class for pupils who quit school on labor permits between 14 and 16 years of age has been authorized by the board of education of Owensboro, Ky. The subject matter of the course will be along the vocational lines and ungraded. The Kentucky state law requires attendance of the pupils who are between 14 and 16. Those above 16 not in school will be encouraged to attend. Each pupil will attend four hours each week—two hours on each of two days.

The Dunkirk, N. Y., Board of Education has remodeled an old grade school for the use of the part-time and pre-vocational classes. The building has been equipped with machinery for wood working, metal working and sheet metal work. The work of the school is to be centered around the study of the automobile, and Earl Fay, for many years with the Franklin Automobile Company, has been engaged as chief instructor in this department, which it is hoped will hold the interest of the average part-time boy. Suitable instruction in homemaking will be provided for the part-time girls in the same building.

Junior High School Mathematics. Course of Study. Cleveland Public Schools. A most valuable course in which the prevocational and vocational purposes of the Junior high school are fully recognized.

Vocational Night School Organized at Hudson, New York. In accordance with the extension education program formulated by Mr. M. C. Smith, Superintendent of Schools at Hudson, New York, a Vocational Night School has been organized in that place. The courses offered are as follows: Auto-mechanics, Drafting, Dressmaking, Millinery, Commercial subjects, Academic subjects. The Commercial and Academic subjects are taught by members of the High School faculty; the other courses are in charge of men and women of many years' experience in their particular fields.

One reason for the popularity of this new work is that the teachers are all recognized experts in their various vocations. All courses are more than filled to capacity, so that it has been necessary to secure three additional teachers. The demand for this type of education is so general that the Vocational Night School will become a permanent part of the educational system.

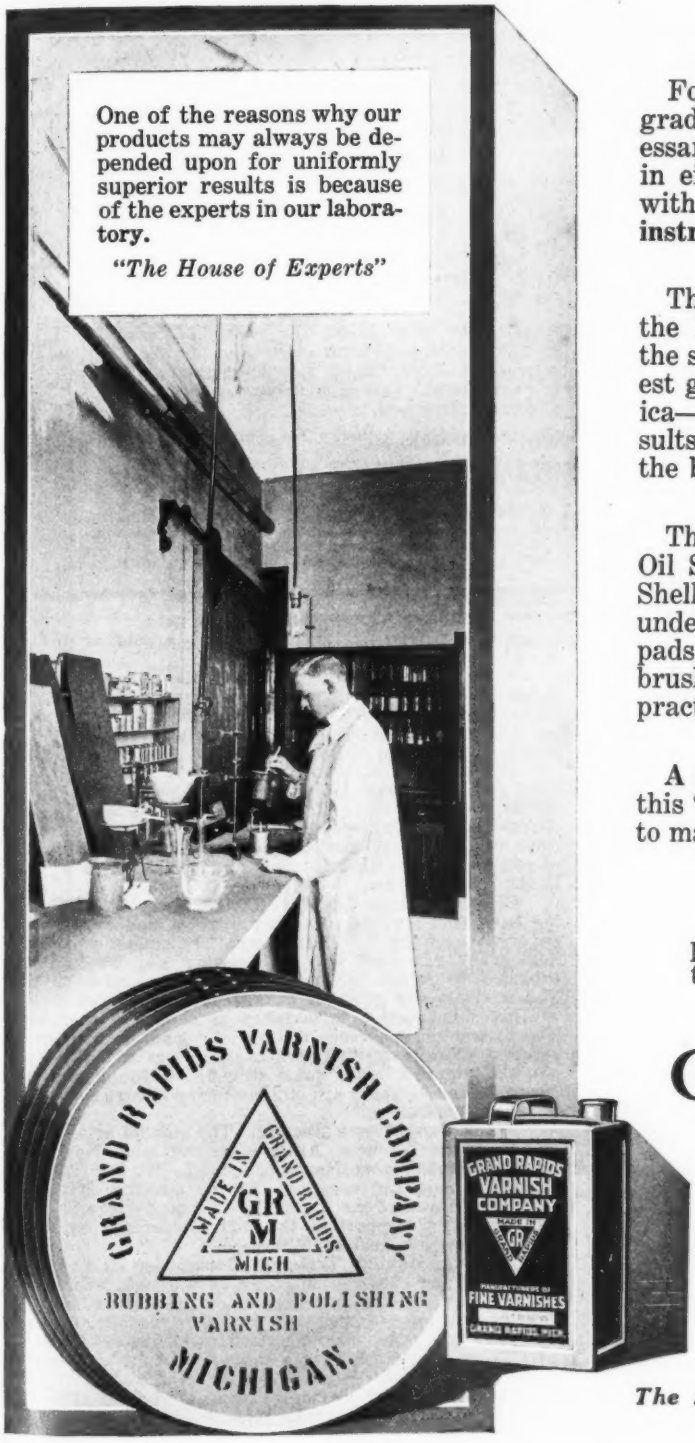
Kenneth R. LaVoy, of the Vocational Department of the High School, has been appointed Director of this extension work.

Lamp Shade Making. Pupils of the household arts department in the Woodward High School, Cincinnati, O., have made a number of lamp shades in preparation for the holiday season. The shades are made of silk, parchment, or batiste and make acceptable Christmas gifts.

Educate Boys in Farm Practice. For several years the school board at Shiloh, N. J., has employed a teacher of agriculture who has given most of his time to boys regularly enrolled in the high school. The board has now

(Continued on Page XXIV)

A PRACTICAL
Wood Finishing Equipment
For Manual Training Schools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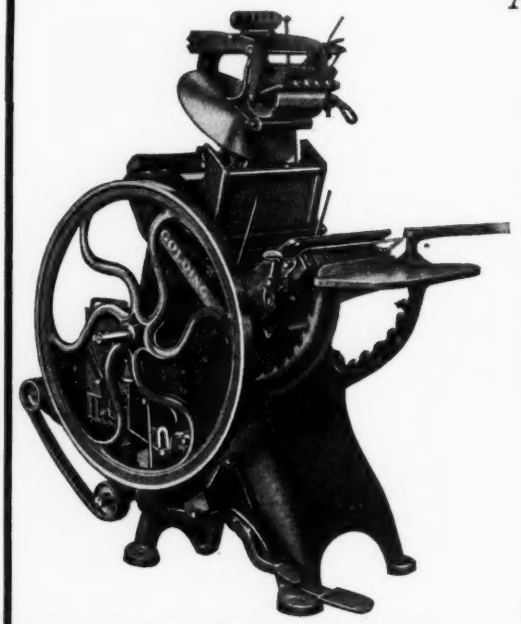

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(Continued from Page XXII)

broadened the work by offering a short course in agriculture during the winter months for farm boys who cannot go to school during the full school year. These boys come to school every day from November 20 to March 20. During the morning hours they will study farming problems of the region dealing with crops, livestock and marketing of farm products. In the afternoon they will study farm arithmetic and English. In addition to the work done at the school, each boy, under the direction of the teacher of agriculture, will carry out some improvement project at home which deals with up-to-date farming methods. The work is being established in other sections of New Jersey as a means of broadening the influence of the schools.

Part-Time Work in Oregon. While Oregon has made only a beginning in agricultural part-time work, the report of the state director for 1921-22 shows that eight regular agriculture instructors made efforts to conduct classes. Thirteen classes have been reported with a total attendance of two hundred and seventy-three. The meetings range from one to four each week and the schools run from one to twelve weeks.

Evening Classes for Adults. Evening schools for adults were conducted at the public schools of Knappa and Svensen, Oregon, in connection with the Smith-Hughes agriculture in the union high school. A total of 75 to 80 different individuals attended at one time or another and the average attendance at each school was about twelve. The outline of the course indicates an effort to cater to popular demand especially in subjects and to work in the fundamentals of scientific feeding, breeding, soil improvement, cultural methods, milk testing, and farm records.

Part-Time in Trades, Industries and Home Economics. Supervisor A. R. Nichols of Oregon has been active in organizing classes and schools and has many of these already in active operation. One of the most interesting is the Salem school of automotive engineering conducted by H. J. Milsom and L. U. Eyerly. The school operates day and night and is under the direct patronage of the state board of vocational education. In Pendleton a group organization of the building trades is almost completed. Roseburg, Medford and other towns have organized courses in automotive engineering.

A Food Source Map. A large colored map showing in what sections of the United States the raising of cattle, swine, sheep, grain, fruit, poultry, etc., etc., is engaged in, has been issued by Armour & Company. It deals with twenty-five articles of food production.

The map is instructive in that it is drawn on state lines and thus gives some idea of the productive ability of the several sections of the country. The reverse side of the map is supplied with reading matter and illustrations descriptive of cattle ranges, stockyards and modes of cattle and meat distribution. The map deserves a place in the school kitchen.

Classes in Brick Laying. Three classes in brick laying have been established at Los Angeles, under the direct supervision of Mr. C. W. Eberling. The classes which are held every afternoon except Saturday and Sunday, are intended to relieve a serious shortage in brick layers. The students are not only taught how to lay bricks but are given instruction in masonry as a part of the work. The instruction embraces mixing and handling of mortar, erection of walls, making corners, fireplaces and chimneys, and the work of laying press brick. All young men between 19 and 25 years are eligible to the classes and there is no tuition fee.

Texas Manual Arts Meeting. The manual arts section of the Texas Teachers' Association will meet November 30 to December 1, at Houston. Mr. L. W. Fox will act as chairman of the sessions. At the meeting, Mr. John Hickman Brown, of the A. and M. College, College Station, will present the report of the 1922 Conference on Vocational Education held at Minneapolis.

Enlarge Manual Training Department. A recent bond issue approved by the voters of Winfield, Kans., provides in part for the enlargement of the manual training department for more printing and other courses of an industrial character. The department at present has an enrollment of 358 boys, each taking work in one regular shop period daily. Full courses in cabinet work, wood turning, mechanical drawing, farm mechanics, gasoline engine work, blacksmithing, and carpentry are given.

(Continued on Page XXVII)

PRINTING

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Punctuation–"Cold Type" demands a proper use of punctuation marks. Commas, periods, colons, semicolons, quotations, exclamation and question marks mean something to the pupil who is taking printing instruction.

Mathematics–The mathematical problems in Printing are interesting and can be used in any grade from the sixth to the high school.

Drawing–Freehand and Geometrical drawings are used freely in Printing.

Science–The theory of light, heat and electricity should always be correlated with Printing. The laboratory problems should be the making of paper, ink and printers' rollers.

Superintendents of schools and principals are urged to request further information about Printing–the Modern Educational Tool. Write to

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by Edward E. Holton

Forge Shop Practice
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Progressive Exercises in Typography
by R. L. Loomis

All of above sent for examination on ten days' approval

THE TAYLOR-HOLDEN CO.
Springfield, Massachusetts

(Continued from Page XXIV)

Short experimental courses in cement work, shoe repairing, printing and electricity are also offered.

The manual training department is operated on a systematic basis and entails no expense to the school except for teachers' salaries. The students pay for the materials used and also work up a great amount of rough material into such school articles as tables, desks, cases and locker cabinets. A number of the pieces made by the students is taken home by the pupil making it.

California Part-Time Classes. Among the list of California cities which have a distinctly separate administration of part-time classes are Alameda, Berkeley, Corona, El Monte, Huntington Park, LaVerne, Long Beach, Los Angeles, Oakland, Petaluma, Pomona, Richmond, Riverside, Sacramento, San Diego, San Francisco, San Luis Obispo, Santa Barbara, Santa Rosa, South San Francisco, Stockton, and Watsonville.

Part-Time High School Courses. The opening of part-time schools in California for the third year has indicated a development in the courses of study offered in the various schools. There has been an attempt to meet varying needs which has led to the addition of many courses and subjects. The courses being offered to the part-time students at the Berkeley part-time continuation high school include commercial training, training for mechanical trades, home making and needle craft, and miscellaneous courses in academic and business subjects.

New Technical High School. The Saunders Trade School, at Yonkers, N. Y., has recently been made a Technical High School by the New York Education Department. At present the school has three unit technical courses, embracing machine design, electrical design, and building and estimating. The new courses appear to be meeting a distinct need since there has been an increase of one hundred per cent in enrollment in the entering class at the opening of the second year of operation. The boys taking the work are of a type showing marked ability and the fact that the courses are four years in length makes it possible for the boys to take good positions upon graduation.

In the machine shop the trade pupils have completed an engine lathe of the quick change gear type, with the necessary jigs and fixtures. They have also made an apron for an engine lathe, with all the mechanism complete for demonstration purposes. The shop is now prepared to make such lathes in quantities.

Evening Industrial School. An evening industrial school, offering courses in cabinet making, dressmaking and academic subjects, has been opened at Louisville, Ky. Arrangements have been made for the opening of special evening classes in the factories.

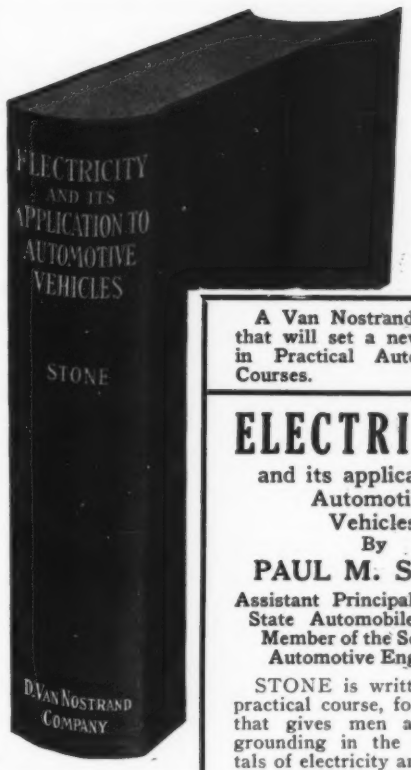
School Pageant. The schools of Louisville, Ky., put on an educational pageant which created considerable interest on the part of the citizens and school patrons. The costumes were made by the pupils of the domestic art department, and the various articles used in the pageant were made by the boys of the manual training shops. The pageant was prepared by Miss Ethel A. Murphy for the Parent-Teachers' League and was directed by Miss Katherine E. Gladfelter. Among the scenes depicted were the moulders of childhood, the ages of civilization, the forerunners of America, work, opportunity, and children of the future.

Exhibition of Paintings. The twenty-second international exhibition of contemporary paintings will open at the Carnegie Institute, Pittsburgh, Pa., on Founder's Day, April 26, 1923. The fine arts committee of the Institute has formulated a new system of selecting paintings for the exhibition, which places the responsibility for the choice of two hundred and seventy-five canvases on the committee of painters themselves. Medals, prizes and awards will be given by the Jury of Award, which is made up of four members, together with the Director of Fine Arts as Chairman. These prizes, medals and honors will be as follows:

First, a medal of the first class (gold), carrying an award of $1,500; second, a medal of the second class (silver), carrying an award of $1,000; third, a medal of the third class (bronze), carrying an award of $500; fourth, an honorable mention for one or more works, as the jury may decide.

Information about the exhibition may be obtained from Mr. Homer Saint-Gaudens, Director of Fine Arts, Carnegie Institute, Pittsburgh, Pa.

Domestic Science Course. A course in domestic science has been introduced in the high school at Reids-



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and its application to Automotive Vehicles

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Assistant Principal Michigan State Automobile School. Member of the Society of Automotive Engineers.

STONE is written for the practical course, for the class that gives men a thorough grounding in the fundamentals of electricity and magnetism and then proceeds to a detailed study of all types of electrical equipment of automobiles.

The book was developed during years of teaching of the subject at the Michigan State Auto School and other schools. Every chapter was submitted to the test of actual classroom use and nothing is included which is not considered vitally essential to a perfect knowledge of this subject.

An important feature of the book is its extremely simple mode of presentation. The mental viewpoint of the student is always before the author and he makes frequent use of repetition where necessary for emphasis.

The practical mechanic as well as the student will appreciate and find valuable, the easy-to-read descriptions and clear cut illustrations of every type of electrical equipment for automobiles, trucks and tractors.

820 pages 7x9 inches. 900 illustrations $4.00

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IAM 1-23

$1,500 FOR STUDENTS

Alvan T. Simonds, President of the Simonds Saw Company of Fitchburg, Mass., and Chicago, Ill., offers two prizes of one thousand dollars and five hundred dollars, open to high school and normal school students in the United States and Canada, for the best essays upon the following subject:

THE LACK OF ECONOMIC INTELLIGENCE
and some of the injuries it has caused to individual and general welfare in the United States since 1860.

This prize contest will, it is hoped, interest many in the study of economics who otherwise might pass it by, and will help to create a public sentiment that will demand the practical study of the subject in every secondary school as a part of the training of every teacher.

Unemployment, hard times and business failures, are economic disorders. They, like the diseases of the human body, can be avoided by increased and widespread economic intelligence.

The essays should emphasize this point. They should give and explain concrete examples of injury to individual or general welfare, or both, due to lack of economic intelligence, also to the readiness to accept economic fallacies and to act upon them,—these examples to come from the history of the United States since 1860 with special emphasis upon the present.

For complete information and rules governing the contest write to

SIMONDS ECONOMIC PRIZE CONTEST
470 Main Street,
FITCHBURG, MASS.

ville, N. C. The new high school which has been under construction, will shortly be occupied by the students and faculty.

Increase in Industrial Courses. The enrollment in the high school industrial courses at Burlington, Ia., has increased more than 125 per cent in the last five years. The enrollment in the unit trade classes in cabinet and mill work, organized two years ago, has increased to such an extent that an additional class has been formed to take care of a waiting list of boys for this work.

In the first semester of seventh grade work, electrical wiring has been substituted for wood work. The plan has been adopted of having eighteen consecutive lessons instead of one lesson a week throughout the semester. The new plan has several advantages over the old one. The pupils and teacher have a better chance to become acquainted and the interest in the work is sustained.

In the part-time classes, interest has been aroused through the building of radio receiving sets. It has been possible through the work to reach boys who could not previously be reached through regular shopwork.

Vocational Advisors. A vocational advisory committee has been appointed at Stockton, Calif., to advise with the school authorities concerning the trade courses to be offered in the high school. The committee will meet monthly, taking up with the teachers such matters as courses of study, buildings, equipment and methods of placement. The special work of the committee will be to connect the trade work in the high school with the local industries so as to make the training of benefit to the boy and to the trade employer.

Teach Practical Trades. A free school offering courses in the practical trades has been opened at Phoenix, Ariz., under the auspices of the University of Arizona. The school is being conducted in conformance with the Smith-Hughes Law. Classes are held two evenings each week in the subjects of machine shop work, automobile mechanics, wood shop work, printing, mechanical drawing, dressmaking and millinery.

Vocational Meeting. The Vocational Congress for Girls was held November 23-25, at Bozeman, Mont. The Montana association is the largest one of its kind in the country and attracts a large attendance of high school girls who come to hear about the opportunities open to them in the several vocations.

Federal Aid in South Carolina. The state of South Carolina has recently received an allotment of $72,857 for vocational education during the year 1922-23. The money provides $47,312 for agriculture; $9,550 for trade, industry and home economics, and $15,000 for the training of vocational teachers. The allotment guarantees federal aid for all classes in agriculture, evening classes in textiles and home economics under the Smith-Hughes Law.

Evening Vocational Courses. Evening courses in carpentry, electricity and wood working have been established at the evening high school, Stockton, Calif. The work is under the supervision of Mr. F. R. Love, head of the high school vocational department.

New Class at Landis Award School. A class in painting and decorating for journeymen has been formed at the Landis Award School conducted in Chicago by the Citizens' Committee to Enforce the Landis Award. The class is open to mechanics who desire to qualify for foremen's positions and for special branches of the painting and decorating trade.

Training Schools in Art. The establishment of industrial art training schools on a par with those of European countries has been urged by Mr. R. P. Ensign, dean of the art school of the Chicago Art Institute. Mr. Ensign holds there is a lack of skilled designers and craftsmen for the needs of the country's industries. He points to the need of an industrial art training school as an extension of the work of the art museum and the art school. This school should devote departments to the arts of architecture, interior decoration, costume design, metal work, jewelry and silverware, work in wood, glass, stone and clay, painting, sculpture, printing and the graphic arts.

Foremen to be Trained. A course in foreman training has been established at San Francisco, Calif., under the direction of Mr. B. W. Johnson.

(Continued on Page XXXI)

How school art stimulates self-expression

WHAT is more vital to your child's success in life than the development of his power of self-expression?

The young mind is absorbing impressions, bits of information which are fast becoming a part of his store of knowledge. But, if he goes on taking in without giving out, if he receives but does not express, his memory will soon be gorged with a mass of dead facts.

Always it has been the art of self-expression that has given us civic character and character. We know the daily life of the ancient Egyptians because they left us unpardonable records, which by the way, were expressed in terms of drawing.

And yet the factor, self-expression, upon which the future of the child so largely depends, has been lost sight of. Many opportunities for developing this essential quality have been neglected.

The total need now recognized

It is clear then that unless the child is to be the loser, the work at home and school must stimulate his power of self-expression, for self-expression enters into every phase of life. A business organization is known by the type of letters it sends forth; A home expresses the individuality of its makers. Self-expression is personality.

Today the very problem is being met by many ingenious methods. Teachers are placing emphasis upon those subjects that allow the child to turn impressions into expression. With classes in school art there are developing true creative ability or imitative. The child is no longer a passive receptacle for facts, he is becoming a creator.

Mr. Gordon Selfridge says: "It is difficult to over-estimate the value of art as applied to manufacturing. On the need which we have as a people for education in artistic taste. All the way from architecture down, we spend our money on products, a large proportion of which, at no greater expense, might have form twice as many times the artistic character. And as a people, at no greater expense, save that of education, we might be deriving several times as much pleasure from living in material surroundings of a higher artistic and therefore pleasure-giving character."

What school art accomplishes

Schoolart is no longer confined to the problems of daily life. It is in fact largely responsible for the changes for the better that are so familiar. Ginger-bread architecture has disappeared. Chromos are gone. What has become of the hideous furniture of twenty years ago? Today, in every town there be found girl clubs offering objects of real beauty, and at prices within reason.

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Your active support is needed

In spite of the tremendous advance that has been made in school art, it is still backward in some communities. And this is largely because parents have failed to lend themselves to its support. For years the school boards, school superintendents, art directors and teachers have continued an uphill struggle against a discouraging public indifference.

It is important then, for the welfare of your child and every other child in your community, that you study your own school art situation and co-operate actively with the men and women who are attempting to direct the young thought into constructive channels.

And if there is no art work at all in your schools, you should individually and with other parents urge the adoption of such courses.

THE AMERICAN CRAYON COMPANY
Established 1835
Sandusky, Ohio New York
The world's largest makers of crayons and water colors

FRANC CRAYONS & WATER COLORS THE "OLD FAITHFUL" CRAYONS

Appearing in the Saturday Evening Post January 13

When parents know the value of school art

Here is a reduced size reproduction of the American Crayon Company's Saturday Evening Post page of January 13th. It is the third of a series of announcements dealing with the value of art in the child's education.

It is plain that art work is handicapped in some schools—largely because parents have failed to lend the support that this subject deserves. However, interest is growing rapidly. The following letter is an example of the new enthusiasm that is permeating homes throughout the country.

FIRST NATIONAL BANK
Auburn, Nebraska, November 17, 1922

The American Crayon Co., Sandusky, Ohio

Gentlemen:

As a parent, the father of a ten-year-old boy, will you please send me more information on "School Art Work"?

Your full page advertisement in the Saturday Evening Post of the 18th instant I read carefully and with great interest and it produced a peculiar appeal in me, as to the particular subject you discussed, and while the mother interested herself in the school art it did not particularly appeal to me as being in a boy's sphere of school work, and I never could see just the need of it, but since listening to your discourse on the subject it has literally "opened my eyes," and I can see of how great importance it is to the boy—and I shall endeavor to further the work all I can.

I can say that our schools have been using this work and in a very commendable manner.

Thanking you, I beg to remain
Yours very truly,

BARTON C. HOWE

This is but one of many responses to these messages that are appearing in The Saturday Evening Post. In such letters is found proof of the fact that as parents are led to understand the significance of school art they are aroused to a spirit of hearty co-operation. And it is this co-operation which has been so badly needed.

The appearance of EVERYDAY ART, the new publication for the exchange of ideas on school art, has met with widespread interest.

Edited by a group of the foremost authorities in this field, it should prove a helpful influence on the future of school art.

When you have constructive ideas on this subject, please send them in. We urge you to use the pages of EVERYDAY ART as a forum for the discussion of questions important to the development of school art.

Use the coupon in sending for this month's issue.

The American Crayon Company
Sandusky, Ohio

Please send me, free of charge, this month's issue of EVERYDAY ART.

Name.....Title.....
School.....Town.....
County.....State.....

THE AMERICAN CRAYON COMPANY
ESTABLISHED 1835
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"The Old Faithful"

DIXON'S ELDORADO

"the master drawing pencil"

There is but one master drawing pencil. Some day you will try it, and then, forever after, one name will come quickly to your mind when you think of the best pencil you have ever used . . And that name is Dixon's Eldorado.

SAMPLE OFFER TO TEACHERS

Write for full-length free samples of "the master drawing pencil" and of Dixon's "Best" Colored Pencils. In their field, Dixon's "Best" Colored Pencils hold the same position of supremacy as Dixon's Eldorado.

— —

JOSEPH DIXON CRUCIBLE CO.

Pencil Dept. 128-J.

Jersey City New Jersey

DIETZGEN DRAWING INKS

are absolutely waterproof, flow freely, dry quickly, and stand color washes. Colors dense, true and brilliant.

Drawing Tables, Boards, Scales, T Squares, Triangles, Curves, Instruments, etc.

The quality will appeal and prices will interest.

EUGENE DIETZGEN CO.

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VAN DYKE DRAWING PENCIL

The Lead That Leads

The even grading in a high quality drawing pencil should be as accurate and uniform as the scales in music.

Neglect of careful pencil grading means "a discord" to the user.

Van Dyke Drawing Pencils constitute a "harmony of perfect grading.

EBERHARD FABER

"The Oldest Pencil Factory in America"

NEW YORK

(Continued from Page XXVIII)

Vocational School. A vocational school for mechanics and tradesmen has been opened at Plant City, Fla., under the provisions of the Smith-Hughes law. The first class will be for men working in mill working shops, carpenters doing finishing and interior work and cabinetmakers. The course will embrace training in making and reading drawings and blue prints of cabinet work, window frames and various other wood constructions. Practical mathematics as a part of the work will be emphasized.

Teach Brick Laying. A course in brick laying has been introduced at Evansville, Ind., for the benefit of boys in the seventh and eighth grades. The course seeks to provide an opportunity for entering a trade and to make possible repair work about the home.

Gift for Vocational Work. Through a joint contribution of $2,500 from the Columbus Retail Merchants' Association, the Manufacturers' and Jobbers' Association and the Columbus Metal Trades' Association, an increase of more than two hundred pupils in the enrollment of vocational part-time pupils has been made possible. The enrollment was three hundred last year.

Part-Time Class in Bricklaying. A class in bricklaying has been successfully conducted at the West High School, Salt Lake, Utah. The students are employed in the trade and spend half time at work and half in the classroom.

Prevocational School. The prevocational school for backward boys, which is being conducted at Fifth and Windlake Aves., Milwaukee, Wis., has been successful in rescuing these boys and in guiding them toward useful vocational work. The school was opened in October, 1920 and consists of two barracks housing the workshops and the classrooms. Out of 270 boys of the lower grades who were placed in the school last year, 269 successfully passed the test which determined their future success. The school prepares the boy for vocational life and 95 per cent of the students expect to enter the industrial life of the city. All subjects in the course are interpreted in the light of utility and the boys are prepared for the selection of a trade or vocation when the time comes. The school is under the direction of Mr. B. L. Daugherty, who acts as principal.

Study Building. Practical problems in building construction are being studied by the manual training classes at the Wight School, Rockford, Ill. Among the subjects studied are excavation methods, figuring costs for excavation work, and building concrete foundations. The work is taken in addition to regular wood projects carried out by the classes.

Miss Anna E. Richardson of Washington, D. C., has been appointed head of the home economics division at the Iowa State College, Ames. Miss Richardson succeeds the late Miss Catherine MacKay.

Miss Mabel V. Campbell of Ames, Ia., has been appointed supervising agent of home economics work in cooperating schools in 22 states. Her territory will extend from Kentucky and Michigan to the Pacific Coast states on the west. In her new position, Miss Campbell will work for the Federal Board of Vocational Education, taking the place made vacant by Miss Genevieve Fisher who went to the Carnegie Institute at Pittsburgh.

PERSONAL NEWS.

Mr. T. L. Lyman of Williamsport, Pa., has been appointed to teach shopwork in electricity in the industrial department of the Williamsport schools.

Mr. Dana Z. Eckert, formerly a manual training teacher at the Latimer Junior High School, Pittsburgh, Pa., has been made assistant principal of the same school.

Mr. J. R. McCloskey, of the McKelvy School, Pittsburgh, Pa., is teaching arts and crafts at the Latimer Junior High School.

Mr. William G. Emerson of the Oswego Normal School, Oswego, N. Y., has been appointed a teacher of printing, at Pittsburgh.

Mr. James Crawford of Carnegie Institute, Pittsburgh, Pa., has been appointed manual training instructor at the Dormont High School, Dormont, Pa.

Mr. Theodore W. Breckheimer, a former graduate student of the Oswego Normal School, is acting as head instructor of industrial arts in the North High School, Minneapolis, Minn.

Mr. Frederick E. Miller, teacher of shopwork at New Rochelle, N. Y., died some months ago. Mr. Miller had served in the world war and at the time of his death was serving the schools in a most useful capacity.

STANLEY TOOLS

Stanley Tools assure the best results. They are the first choice of master craftsmen.

No. 5 "Bailey" Plane; iron; 14-in. long; 2-in. cutter; Frog adjustable; Rosewood handle and knob.

No. 5

No. 20—6-inch

No. 20 Screw Driver. Standard head; blades of standard type, with proportionate tips and handles; handles are fluted and stained black.

No. 20

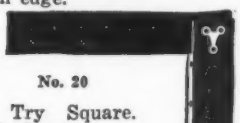
No. 20 "Everlasting" Chisel. Head, Shank and Blade of patented construction, and forged from one piece. Handle of selected Hickory.

No. 65¾

No. 65¾ Marking Gauge. Boxwood; polished brass screw; adjustable point and pencil; face plate.

No. 12 Hammer. Bell face, round neck and poll; curved claw. Made of special steel carefully forged, hardened and tempered. Handle of second-growth White Hickory. Pulling strain comes on body of claw, and not on edge.

No. 12



No. 20

No. 20 Try Square. "Hand-y" Feature, Brass Face Plates; blued blades; edges of blades are machined and are square inside and out. Rosewood handle.

Write to Dept. 16-M for Catalog No. 34.

THE STANLEY RULE & LEVEL PLANT.
THE STANLEY WORKS
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STANLEY SW New York Chicago San Francisco Los Angeles Seattle

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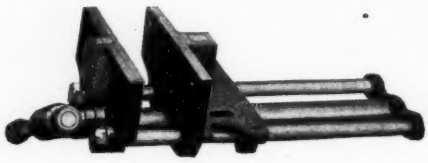
Sledge-Tested VISES



WRITE today for the complete catalog of Columbian Metal and Woodworking Vises. It will assist you in selecting proper vise equipment. The vise illustrated is of unusually good quality at an attractive price — simple, sturdy, and easy to attach to any style of bench. But it is only one of the many models designed for every conceivable purpose.

The Columbian Hardware Company

Manufacturers

World's largest makers of Vises and Anvils

Cleveland, Ohio.

MANUFACTURERS NEWS COLUMN

Economic Prize Contest. Actuated by a desire to advance the study and more general appreciation of the subject of economics, Mr. Alvan T. Simonds, president of the Simonds Saw Co., Fitchburg, Mass., has announced a prize essay contest open to students of high school and normal schools in the United States and Canada. Mr. Simmonds has offered two prizes of $1,000 and $500 for the best essays written by students on the subject: "The Lack of Economic Intelligence and Some of the Injuries It Has Caused Individual and General Welfare."

The contest is intended to arouse an interest in the subject of economics on the part of teachers and students in secondary and normal schools, and to suggest a practical study of problems of recent times. In the opinion of Mr. Simonds, unemployment, business depressions and strikes are economic disorders which can be largely avoided by increased and general economic intelligence.

OLIVER No. 36 SWING CUT-OFF SAW.

As a foundation, the essays should be constructed on facts and examples which bear on the subject and which may be obtained from the history of the United States since 1860, with special emphasis upon the present.

Complete details concerning the contest may be had by addressing the Simonds Economic Prize Contest, 470 Main St., Fitchburg, Mass.

Johnson Friction Clutches — The Carlyle Johnson Machine Company has just issued a new illustrated circular and price list illustrating and describing the well-known Johnson Friction Clutches. These clutches commend themselves especially for use in school shops because of their safety, smooth, operation and sturdy construction. Johnson clutches are noted for being boy proof and withstanding the heavy duty which is inflicted upon them by apprentices, students and in general by persons who are unacquainted with the handling of machinery.

Catalog Bulletins. Teachers of sheet metal work will be interested in an important series of bulletins which are being published by the Niagara Machine and Tool Works of Buffalo, N. Y. Bulletin No. 58 which is ready for distribution is a complete, illustrated catalog of inclinable open back power presses. A copy will be sent on request.

Another bulletin which is also ready, covers power presses and is designated as No. 59. The third bulletin No. 61 covers power punch presses. All three bulletins are available for any teacher who may desire them.

Interesting Shop Decorations — Four most interesting wall cards for decorating the school shop during the Christmas season—and thereafter as well—have been prepared by the Stanley Rule & Level Co., New Britain, Conn. The cards are in full color and while they frankly advertise Stanley tools, they convey a most valuable lesson on the use of tools and the value of woodworking to boys. The subjects of the cards are as follows:

His Hobby — A business man interested in woodworking and tools as a hobby.

Doping It Out With Dad — Toy construction at home.

Pals — Father and son doing repair job at home.

Christmas morning — A tool chest as a Christmas gift.

(Concluded on Page XXXV)

ART-FIBRE WEAVING

This valuable vocational study is arousing unusual interest among educators throughout the country. It is more than a pastime. It is a vocation with ramifications that reach far and wide. One soon becomes expert and can develop original designs. The finished product commands an attractive price and the student weaver thus completes the cycle of manufacturing, finishing, decorating and merchandising the product of his own design.

OUR COMPLETE ART-FIBRE WEAVING SERVICE

You can secure all materials necessary for weaving, finishing and decorating an assortment of over fifty designs. Frames of the finest construction are shipped knocked down with all holes properly bored and fitted for assembling. Art-Fibre Cord, Frames, fixtures and finishes can be supplied at one price or purchased in separate units.

BOOK OF INSTRUCTIONS FREE ON REQUEST WITH AN ORDER OF $10.00 OR MORE

This instruction book of 32 pages and over fifty illustrations describes in detail with progressive illustrations the fundamental principles of weaving. Several popular projects are progressively illustrated with full directions. Single, double, triple and quadruple weaving, whaling, over-casting, closed borders and seating are clearly explained. This book free on request with an order of $10.00 or more. Extra copies 25c.

FERNERY No. 60

Frame Knocked Down with all weaving and finishing materials.

Varnish finishes, Walnut, Mahogany, or Kraft Brown..$6.10
Enamel finishes, your choice of 11 colors..... 7.10
Duo-tone Enamel finishes in Old Ivory, Frosted Brown, Frosted Blue, Frosted Ebony, Blue and French Grey, Blue and Buster Brown, Green and Putty, also Black and Tan..... 7.45
Galvanizd Iron Pan to fit, EXTRA..... 1.20

TEA WAGON No. 922

Frame Knocked Down and complete materials in Walnut, Mahogany or Kraft Brown Varnish finish.....$10.80
Enamel finish (your choice of eleven colors)..... 12.25
Duo-Tone Enamel finish (your choice of eleven colors). 12.55

FERNERY No. 60.
Width 11 inches, length 28 inches, height 29 inches.

TEA WAGON No. 922.
Top 25¾ x 17¾ inches. Wheels, Tubular spoked 14 x ⅝ inches. Removable tray, 5-ply veneer bottom.

LET US TELL YOU ABOUT ART-FIBRE WEAVING.

Write for our catalog.

GRAND RAPIDS FIBRE CORD COMPANY

GRAND RAPIDS, MICH.

Tannewitz QUALITY

Tannewitz Portable Bench Saw

"The Precision Tool Of A Thousand Uses"

Adapts itself with astonishing facility to the needs of all high class institutions.

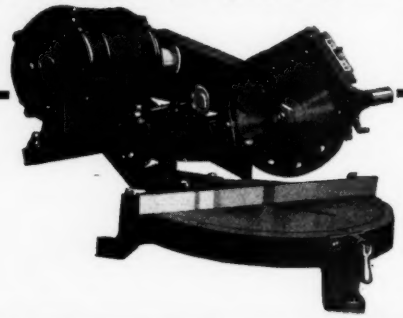
What It Is. Motor and saw are mounted on a special frame swiveling 45 degrees in either direction. Thus, both right angled and oblique cuts may be made. Plugs into nearest lighting socket. Accurate gauge and locking device permit difficult bevels to be produced almost instantly and with unfailing accuracy.

What It Does. The TANNEWITZ Portable requires less power and less floor space than any other, and is the safest saw on the market. Greatly reduces time, labor and trouble of minor operations. Ample capacity for all ordinary work. A thoroughly well made tool with more exclusive precision features than any other.

Our special bulletin is free for the asking—write for it.

THE TANNEWITZ WORKS

305 Front Ave., N.W., Grand Rapids, Mich., U.S.A.



Manual Training Bench No. 270

When in the market for Manual Training Benches, Domestic Science Tables, Sewing Tables, Drawing Tables, Vises, Hand Screws, etc., write to

C. CHRISTIANSEN

Manufacturer of This Line Since 1898.

2814 West 26th St., CHICAGO, ILL.

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(Concluded from Page XXXII)

New Bench Saws. W. B. & J. E. Boice, Toledo, Ohio, have issued a new descriptive circular of the Boice Bench Saws which are widely used in schools and industrial establishments. The Boice saws are furnished in two models, motor driven and equipped for a wide variety of work. The saws are manufactured with a rigid cast iron frame and a heavy iron top so that the portability of the saw is no drawback on its capacity for heavy duty work. The saw is fully guarded to protect the operator. The motor is supplied with A. C. or D. C. winding to suit any local requirements and can safely be attached to a lighting circuit. Copies of the circular will be sent to any school authorities on request.

Change in Organization. The Columbian Hardware Company of Cleveland has recently acquired the plant, offices and equipment of the hardware division of the Consolidated Iron-Steel Mfg. Company. The new organization is headed by Mr. H. F. Seymour, who has surrounded himself with an able organization.

The company manufactures heavy hardware only and markets a special line, including the well-known Columbian sledge tested vises and anvils.

The new organization is alive to its responsibilities and is filled with a desire to carry out a new spirit of service. The firm's enlarged manufacturing and sales facilities makes it possible to concentrate entirely on the manufacture and sale of vises and anvils and places the company in position to give better service than in the past.

Women's Clothes Shop. A modern clothes shop for women has been opened by the Margaret Morrison Carnegie College of Carnegie Institute of Technology, at Pittsburgh. Orders for dresses, gowns and other women's apparel are filled by students of the department of costume economics of the College, who through the experience gained in fitting, designing and creating are obtaining a thorough training. The clothes shop also carries a stock of novelties and other merchandise of interest to women patrons, in addition to a substantial assortment of modern fashions and models. The shop is open four afternoons a week and is in charge of Miss Jane Fales, head of the department of costume economics of the College.

Shop Installed. The Greenfield high school, at Greenfield, Ind., has been remodeled in such a manner as to provide much needed room for a manual training shop and finishing room.

Furniture Building. A furniture building program was successfully carried out at Bethlehem, Pa., during the past summer by trade carpenters under the direction of Mr. E. J. Overfield, teacher of industrial-art subjects, and Mr. I. L. Koch, instructor in trade carpentry. Among the pieces completed were 83 oak dining tables for the Liberty High School; 38 drop-leaf sewing tables; 24 student drawing tables and several stools and stands for the home economics department. The Liberty School opened with the fall term, with equipment for teaching drafting, machine shop work, pattern making, electricity, printing and sheet metal work.

Largest Enrollment. The vocational department at Chester, Pa., opened with the largest enrollment in its history. The incoming freshman group has hastened the necessity of relief for congested conditions. Further expansion to accommodate the larger classes will be secured by the removal of the vocational department to a new two-story structure to be erected across from the present high school building. It will be equipped for teaching electricity, drafting, sheet metal work, automobile mechanics and printing, in addition to the present courses offered in the school.

Build Equipment. Most of the new equipment for the Roosevelt Junior High School at Erie, Pa., will be built by the trade classes. Two groups of special development boys between 14 and 17 years will assist in the building of the equipment. The cabinet trade boys will construct the jigs and these special boys will be trained as operators.

Thompson Memorial. The Vocational Education Society of Boston has appropriated $50 to the Frank V. Thompson Memorial Association to be applied toward a bronze memorial of the late superintendent Thompson. The memorial is to be placed in the new Frank Thompson School.

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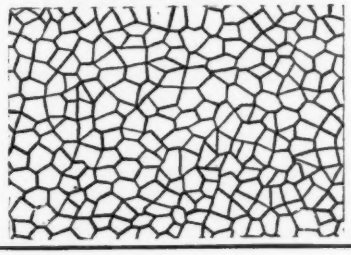

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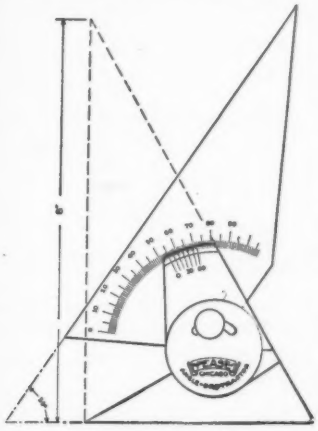

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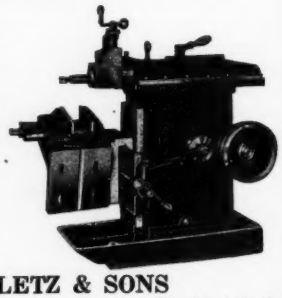

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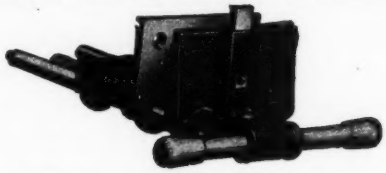

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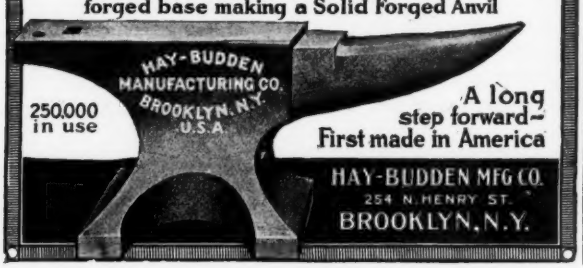

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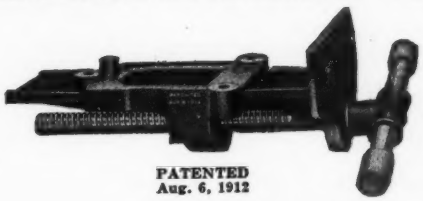

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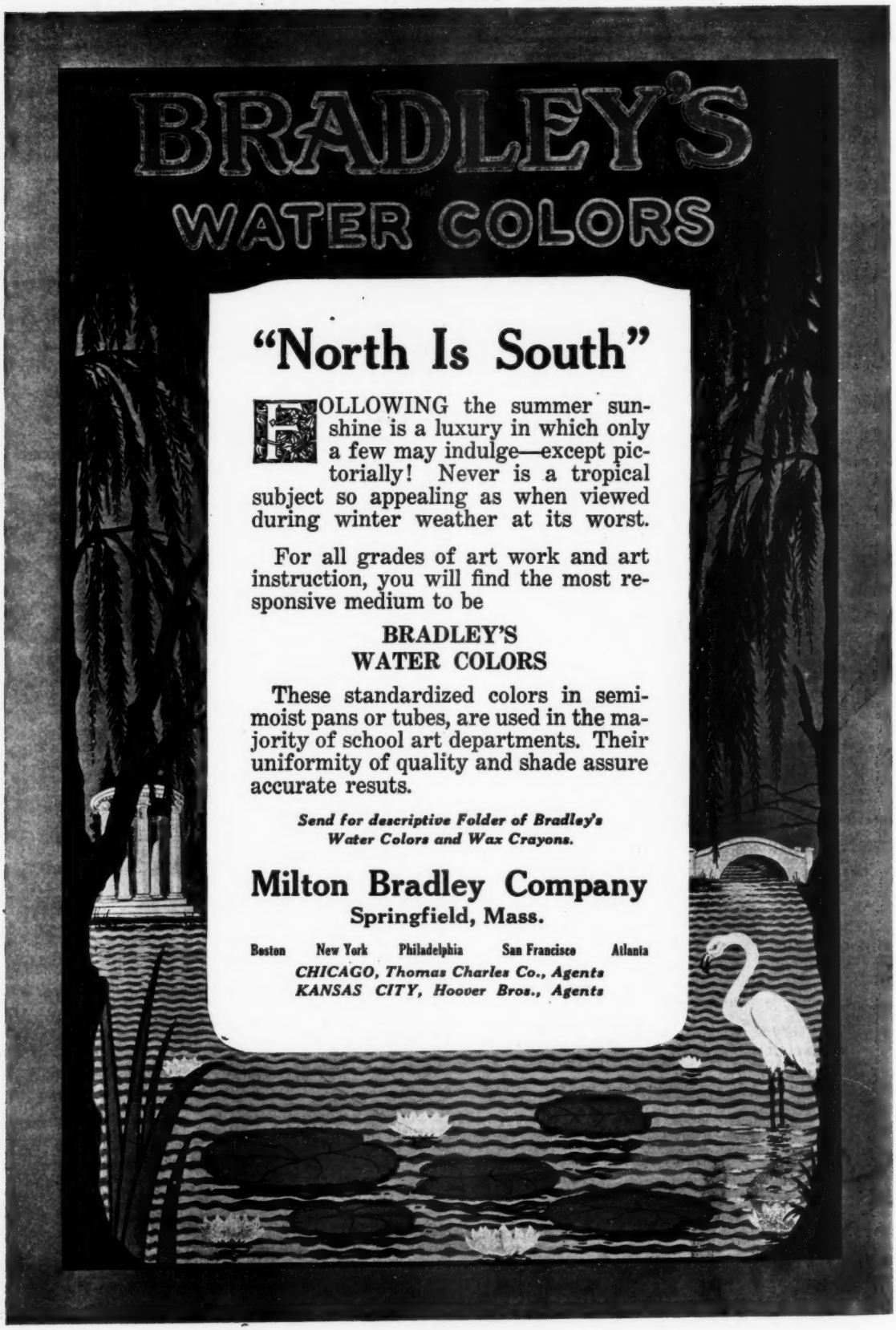

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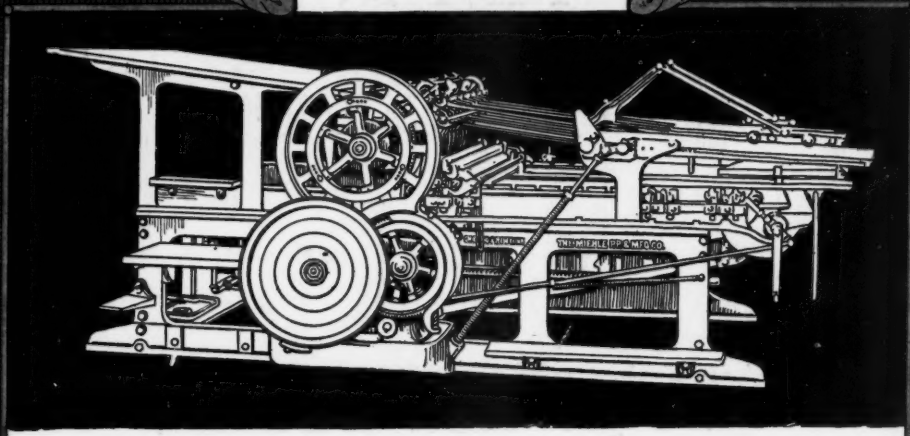

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